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Occupational therapy for adults with problems in activities of daily living after stroke (Review)

Legg LA, Lewis SR, Schofield-Robinson OJ, Drummond A, Langhorne P

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[Intervention Review]

Occupational therapy for adults with problems in activities of daily living after stroke

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ABSTRACT

Background

A stroke occurs when the blood supply to part of the brain is cut off. Activities of daily living (ADL) are daily home-based activities that people carry out to maintain health and well-being. ADLs include the ability to: eat and drink unassisted, move, go to the toilet, carry out personal hygiene tasks, dress unassisted, and groom. Stroke causes impairment-related functional limitations that may result in difficulties participating in ADLs independent of supervision, direction, or physical assistance.

For adults with stroke, the goal of occupational therapy is to improve their ability to carry out activities of daily living. Strategies used by occupational therapists include assessment, treatment, adaptive techniques, assistive technology, and environmental adaptations. This is an update of the Cochrane review first published in 2006.

Objectives

To assess the effects of occupational therapy interventions on the functional ability of adults with stroke in the domain of activities of daily living, compared with no intervention or standard care/practice.

Search methods

For this update, we searched the Cochrane Stroke Group Trials Register (last searched 30 January 2017), the Cochrane Controlled Trials Register (*The Cochrane Library*, January 2017), MEDLINE (1946 to 5 January 2017), Embase (1974 to 5 January 2017), CINAHL (1937 to January 2017), PsycINFO (1806 to 2 November 2016), AMED (1985 to 1 November 2016), and Web of Science (1900 to 6 January 2017). We also searched grey literature and clinical trials registers.

Selection criteria

We identified randomised controlled trials of an occupational therapy intervention (compared with no intervention or standard care/practice) where people with stroke practiced activities of daily living, or where performance in activities of daily living was the focus of the occupational therapy intervention.

Data collection and analysis

Two review authors independently selected trials, assessed risk of bias, and extracted data for prespecified outcomes. The primary outcomes were the proportion of participants who had deteriorated or were dependent in personal activities of daily living and performance in activities of daily living at the end of follow-up.

Main results

We included nine studies with 994 participants in this update. Occupational therapy targeted towards activities of daily living after stroke increased performance scores (standardised mean difference (SMD) 0.17, 95% confidence interval (CI) 0.03 to 0.31, P = 0.02; 7 studies; 749 participants; low-quality evidence) and reduced the risk of poor outcome (death, deterioration or dependency in personal activities of daily living) (odds ratio (OR) 0.71, 95% CI 0.52 to 0.96; P = 0.03; 5 studies; 771 participants; low-quality evidence). We also found that those who received occupational therapy were more independent in extended activities of daily living (OR 0.22 (95% CI 0.07 to 0.37); P = 0.005; 5 studies; 665 participants; low-quality evidence). Occupational therapy did not influence mortality (OR: 1.02 (95% CI 0.65 to 1.61); P = 0.93; 8 studies; 950 participants), or reduce the combined odds of death and institutionalisation (OR 0.89 (95% CI 0.60 to 1.32); P = 0.55; 4 studies; 671 participants), or death and dependency (OR 0.89 (95% CI 0.64 to 1.23); P = 0.47; 4 trials; 659 participants). Occupational therapy did not improve mood or distress scores (OR 0.08 (95% CI -0.09 to 0.26); P = 0.35; 4 studies; 519 participants; low-quality evidence). There were insufficient data to determine the effects of occupational therapy on health-related quality of life. We found no studies of consenting carers prior to study participation and therefore there were no carer-related outcomes in our review. There were insufficient data to determine participants' and carers' satisfaction with services.

Using GRADE, the quality of evidence was low. The major limitation was the number of studies at unclear risk of selection bias and an inevitable high risk of performance and detection bias, as both participants and occupational therapists could not be blinded to the intervention. In addition, there was a sparseness of data for our outcomes of interest and we downgraded the quality of our evidence for these reasons.

Authors' conclusions

We found low-quality evidence that occupational therapy targeted towards activities of daily living after stroke can improve performance in activities of daily living and reduce the risk of deterioration in these abilities. Because the included studies had methodological flaws, this research does not provide a reliable indication of the likely effect of occupational therapy for adults with stroke.

PLAIN LANGUAGE SUMMARY

Occupational therapy for adults with problems in activities of daily living after stroke

Review question
What are the effects of occupational therapy for adults with stroke on activities of daily living?

Background
Different parts of the brain carry out different functions: seeing, sensation, balance, movement, understanding language, behaviour, problem solving, and emotion. A stroke occurs when the blood supply to part of the brain is cut off. If the blood supply is cut off to a part of the brain that carries out a particular function (such as seeing, moving arms and legs, or speaking), then these body parts or body functions will not work as they should.

Activities of daily living (ADLs) are daily household-based activities that people carry out to maintain health and well-being. ADLs include eating and drinking, moving about, going to the toilet, personal hygiene, dressing and undressing, and grooming. When stroke changes how body parts or functions work, then the ability to carry out ADLs can become affected.

For adults with stroke, the goal of occupational therapy is to improve ability to carry out ADLs. Strategies used by occupational therapists include activity-based interventions, adaptive techniques, assistive technology, and environmental adaptations.

Study characteristics
We found nine studies up to January 2017, involving 994 participants, that looked at the benefits of occupational therapy interventions for adults with stroke who had problems with activities of daily living. This is an update of the Cochrane review first published in 2006.

Key result
We found that occupational therapy for people with stroke can improve their ability to carry out these daily activities and stop them deteriorating in those abilities. We found no evidence that occupational therapy reduced rates of death or the need to be cared for in an institution, or affected mood or distress of the participant. We did not collect data on carer-related outcomes or participant satisfaction with the service.

Quality of the evidence
There were few studies measuring our outcomes of interest and we judged the quality of the evidence to be of low-quality. Many of the studies did not report methods sufficiently clearly and it was not possible to mask the occupational therapy from the person giving or

receiving the treatment; this could also have influenced the results in our studies. We did not have sufficient good-quality evidence to be certain of our results and we cannot be certain that future studies will not change these conclusions.

Summary of findings for the main comparison. Occupational therapy compared to usual or no care for stroke

Occupational therapy compared to usual or no care for stroke

Patient or population: adults with stroke
Setting: any (with the exception of care- or nursing-home settings). Included studies conducted in: Hong Kong, UK, and USA

Intervention: occupational therapy
Comparison: no intervention or standard care/practice

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual or no care	Occupational therapy				
Activities of daily living at end of scheduled follow-up.	The mean activities of daily living score was 80.4[3]	The mean activities of daily living score in the intervention groups was **0.17 standard deviations higher** (0.03 to 0.31 higher)		749 (7 studies)	⊕⊕⊝⊝ **low** [1,2]	A standard deviation of 0.17 represents a small difference between groups
Odds of death or a poor outcome at end of scheduled follow-up. Combined odds of death and deterioration, or death and dependence, or death and institutional care	**Study population**		**Peto OR 0.71** (0.52 to 0.96)	771 (5 studies)	⊕⊕⊝⊝ **low** [1,2]	
	440 per 1000	**313 per 1000** (229 to 423)				
	Moderate					
Extended Activities of Daily Living at end of scheduled follow-up. Measures of Extended Activities of Daily Living	The mean Extended Activities of Daily Living score was 33.3[3]	The mean Extended Activities of Daily Living score in the intervention groups was **0.22 standard deviations higher** (0.07 to 0.37 higher)		665 (5 studies)	⊕⊕⊝⊝ **low** [1,2]	A standard deviation of 0.22 represents a small difference between groups
Mood or distress scores Measures of mood or distress	The mean depression score was 19.8[3]	The mean mood or distress scores in the intervention groups was **0.08 standard deviations higher** (-0.09 lower to 0.26 higher)		519 (4 studies)	⊕⊕⊝⊝ **low** [1,2]	A standard deviation of 0.08 represents a small difference between groups

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] We downgraded the quality of this evidence one level for serious risk of selection, performance and detection biases (the latter only for subjective outcomes)
[2] We further downgraded by one level for serious imprecision (due to small sample sizes, few events and wide confidence intervals).
[3] Data taken from a study (Parker 2001) in the meta-analysis that is representative of the population and intervention and at low risk of bias.

BACKGROUND

Description of the condition

Stroke is the death of brain tissue as a result of an interruption of the blood flow leading to or within the brain, or by an aneurysm or ruptured blood vessel in the brain. Activities of daily living (ADLs) are normal day-to-day household-based tasks and activities that people carry out to maintain health and well-being. ADLs include eating and drinking, moving about (such as getting into and out of bed, turning over in bed, getting on and off a chair, moving between rooms, moving between levels (using stairs)), going to the toilet (including carrying out toilet hygiene), carrying out personal hygiene tasks (including washing hair and body, and drying oneself), getting dressed and undressed, and grooming activities (including performing oral hygiene activities, combing hair, shaving). Stroke causes impairment-related functional limitations that may result in difficulties carrying out ADLs independent of supervision, direction, or physical assistance.

Description of the intervention

For adults with stroke, the goal of occupational therapy is to improve the ability to carry out activities of daily living. Strategies used by occupational therapists include assessment, treatment, adaptive techniques, assistive technology, and environmental adaptations.

How the intervention might work

The central aspects (or core components) of occupational therapy for adults with stroke include the following.

Assessment

Assessment allows occupational therapists to gather important information about the adult with stroke and the difficulties they are facing. The purpose of assessment is to:

- determine the impact of stroke-related changes in body structures and body functions on the adult's skills, capacities, and abilities to independently initiate, sustain, and complete actions and tasks necessary to carry out activities of daily living (i.e. stroke-related impairment-related functional limitations) (Gillen 2016a; ICF 2001; OTfPD 2008a).
- identify the adult with stroke's perceived problems and priorities and to prioritise main concerns.
- learn about stroke-related impairment-related functional limitations by observing the adult with stroke carrying out meaningful tasks, such as getting dressed or eating (Gillen 2016e; OTfPD 2008e).

All assessments are used to analyse how the adult with stroke completes activities of daily living, the results of which are used to create a therapy plan.

Partnership

Occupational therapists work in partnership with adults with stroke and make joint decisions about what therapeutic interventions and individual goals are appropriate and relevant (OTfPD 2008c).

Programme plan

There is a programme plan for each adult with stroke and this plan includes all activities necessary to achieve clinical recovery and performance improvement for that given individual (OTfPD 2008c).

The programme plan includes detailed specifications of individual short-term and long-term goals, and treatment approaches and methods to be employed to achieve the goals. The nature and definition of individual goals is a shared decision between the adult with stroke and occupational therapist and is based on the self-determined needs and preferences of the adult with stroke combined with the best available information from assessments, current best scientific information, and clinical judgement (OTfPD 2008c).

Occupational therapy treatment approaches and methods are selected based on intentionality, appropriateness, and resources available (OTfPD 2008b). Short-term and long-term goals are the stages into which the programme is divided for monitoring, and evaluation and measurement of the impact of therapy (OTfPD 2008c).

Activities of daily living as a therapeutic medium and goal

Occupational therapists use activities of daily living as a means to achieve therapeutic change (improvement in capacities and abilities) and as the goal of therapy (i.e. to achieve improvements in activities and participation) (ICF 2001; OTfPD 2008d).

Intentionality

Interventions are directed towards activities that adults with stroke believe are worthwhile investing effort in and are keen to improve (Gillen 2016b; OTfPD 2008d).

Appropriate

Interventions are designed to be appropriate to the level of skill, capacities, abilities, intentions, interests and intra-psychological processes of adults with stroke (OTfPD 2008c; OTfPD 2008d).

Incremental and progressive

Interventions targeted towards clinical recovery are designed to be progressive with incremental increases in activity and difficulty levels (OTfPD 2008e).

Healthy perceptions, attitudes, and behaviour-focused

Therapeutic contacts emphasise and encourage healthy perception, attitudes, and behaviour through concrete experience, positive feedback, and reinforcement (Gillen 2016c; OTfPD 2008d).

Active engagement in authentic practice

Interventions are designed to engage the adult with stroke in authentic practice of actions, activities, and interactions (OTfPD 2008d; Gillen 2016b; Gillen 2016c).

Enduring and applicable

Interventions are designed to promote therapy generalisation and long-term maintenance of therapeutic change by empowering stroke patients (Gillen 2016c).

Evaluation and accountability

Intervention effectiveness is evaluated continuously by both the occupational therapist and stroke patient. The occupational therapist assumes accountability for achieving outcomes (Gillen 2016a; OTfPD 2008b; OTfPD 2008c).

Why it is important to do this review

As mortality rates from stroke continue to improve, so do the odds that several generations of stroke survivors are alive at the same time. Many stroke survivors have marked limitations in ability to perform routine ADLs as a result of stroke-related physical or mental impairment. As a consequence, many stroke survivors require some form of long-term care, which includes unpaid care (provided by family and friends), government or funded personal care services, assisted living, and residential or nursing care. The significant costs associated with providing this support is likely to be borne by families and society.

Occupational therapy aims to help people reach and maintain their maximum level of function and self-reliance in ADL.

The original Cochrane review (Legg 2006), including eight studies involving 1258 participants, found that occupational therapy interventions reduced the odds of a poor outcome (dependency or deterioration) and increased personal ADL scores. This is an update of the original review. A GRADE (Grades of Recommendation, Assessment, Development and Evaluation Working Group) approach was not used to assess the quality of the evidence in the original review.

OBJECTIVES

To assess the effects of occupational therapy interventions on the functional ability of adults with stroke in the domain of activities of daily living, compared with no intervention or standard care/practice.

METHODS

Criteria for considering studies for this review

Types of studies

We sought all randomised controlled trials (RCTs) of adults with stroke receiving an intervention provided by an occupational therapist, or under the supervision of an occupational therapist, with the specific aim of improving functional capacity or performance in activities of daily living (ADL) compared with no intervention or standard care/practice. We excluded studies which compared different types of occupational therapy intervention. We included randomised cross-over studies.

Types of participants

We included trials that recruited adults (aged 18 years and above) who met a clinical definition of stroke (focal neurological deficit caused by cerebrovascular disease).

We excluded trials of mixed aetiology where the percentage of adults with stroke was less than 50%. We also excluded trials that only included adults with specific stroke-related impairments (i.e. neuromusculoskeletal and movement-related impairments, or changes in muscle power, or mental impairment, or sensory impairment, or voice and speech function impairment).

Types of interventions

We included trials of occupational therapy interventions, which had the following features.

- Described as an occupational therapy intervention.
- Delivered by an occupational therapist or under the supervision of an occupational therapist.
- Focused on activities of daily living (ADL), which are eating and drinking, functional mobility, going to the toilet, dressing, carrying out personal hygiene (including washing body, bathing/showering), grooming (including oral hygiene) (Gillen 2016d).
- Occupational therapy interventions fell under one or more of the following categories:
  - treatments focused on remediating impaired capacities or abilities in the context of ADLs (OTfPD 2008c) such as task-orientated approaches (Gillen 2016b) or activity-based interventions (Gillen 2016d);
  - the use of adaptive (compensatory) techniques as an alternative way to effectively complete ADLs (OTfPD 2008c);
  - the use of assistive technology (AT) in which the adult with stroke has the use of any item, piece of equipment, or product system to increase, maintain, or improve their functional capacity (ATiA); or
  - environmental adaptations in which the participant's physical environment is modified with ramps, electric hoists, stair lifts, handrails, level access, or wet-room wheelchair accessible shower (Age UK 2017) in order to restore or enable self-reliance, privacy, confidence, or dignity for the adult with stroke.

We included trials in which the control group received no intervention or standard care/practice.

We excluded trials:

- of occupational therapy interventions delivered to adults with stroke in care or nursing homes, as this is covered in a separate review (Fletcher-Smith 2013);
- comparing occupational therapy interventions being delivered in different settings, e.g. occupational therapy in clinic versus occupational therapy at home;
- that included occupational therapists as part of a multidisciplinary team as they are or will be covered in other reviews and therefore are beyond the remit of this review;
- that included occupational therapy interventions in combination with other interventions, for example, occupational therapy and brain stimulation;
- testing specific treatment approaches, e.g. task-specific training or cognitive training.

If multi-arm studies included more than one intervention performed by an occupational therapist, we selected the intervention arm that was most closely related to our review objectives (Higgins 2011c).

Types of outcome measures

We were interested in outcomes that assessed whether occupational therapy improves activities in daily living (ADL), as reflected in our primary outcomes. We collected data which

were reported and measured by study authors using appropriate measurement tools, at the end of scheduled study follow-up.

We required that study authors reported that unpaid carers had provided consent prior to study participation for inclusion of carer-related outcomes in our review.

Primary outcomes

- Performance in personal ADL at the end of scheduled follow-up. Measures of ADL included Barthel Index or Functional Independence Measure (FIM).
- Death or a poor outcome at the end of follow-up*. We defined this as the combined outcome of being dead or:
  * having deteriorated, characterised by experiencing a deterioration in ability to perform personal activities of daily living (i.e. experiencing a drop in ADL score); or
  * being dependent, characterised by lying above or below a predefined cut-off point on a given ADL scale; or
  * requiring institutional care at the end of scheduled follow-up.

* The primary outcome 'Death or a poor outcome' is a composite outcome with some components appearing as secondary outcomes.

Secondary outcomes

- Death at the end of scheduled follow-up.
- Number of participants dead or physically dependent at the end of scheduled follow-up.
- Number of participants dead or requiring institutional care at the end of scheduled follow-up.
- Performance in extended activities of daily living (EADL) (community and domestic activities) at the end of scheduled follow-up. Measure of EADL included Frenchay Activities Index or Nottingham Extended ADL.
- Participant mood at the end of scheduled follow-up. Measures of mood included Beck Depression Inventory, or Hospital Anxiety and Depression Scale.
- Participant health-related quality of life (HRQOL) at the end of scheduled follow-up. Measures included EuroQOL, or Nottingham Health Profile.
- Carer mood at the end of scheduled follow-up. Measures included Beck Depression Inventory, or Hospital Anxiety and Depression Scale.
- Carer health-related quality of life at the end of scheduled follow-up. Measures included EuroQOL, or Nottingham Health Profile.
- Participant and carer satisfaction with services.

Search methods for identification of studies

See the 'Specialized register' section in the Cochrane Stroke Group module. We attempted to identify all relevant trials, regardless of language or publication status, and arranged translation of relevant papers, where necessary.

Electronic searches

For this update we searched the following:

- Cochrane Stroke Group Trials Register (searched 31 January 2017);
- Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 1) in the Cochrane Library (searched 11 January 2017) (Appendix 1);
- MEDLINE Ovid (1946 to 5 January 2017) (Appendix 2);
- Embase Ovid (1974 to 5 January 2017) (Appendix 3);
- CINAHL EBSCO (Cumulative Index to Nursing and Allied Health Literature; 1937 to 5 January 2017) (Appendix 4);
- PsycINFO Ovid (1806 to 2 November 2016) (Appendix 5);
- AMED Ovid (The Allied and Complementary Medicine Database; 1985 to 1 November 2016) (Appendix 6);
- Web of Science (limited to Science Citation Index Expanded, Social Sciences Citation Index, Conference Proceedings Citation Index - Science, and Conference Proceedings Citation Index - Social Science & Humanities; 1900 to 6 January 2017) (Appendix 7);
- OpenGrey (System for Information on Grey Literature in Europe; http://www.opengrey.eu; 1980 to January 2017) (Appendix 8).

We developed the MEDLINE search strategy (Appendix 2), which included controlled vocabulary and free-text terms, with the help of the Stroke Group's Cochrane Information Specialist (Joshua Cheyne) and adapted this for the other databases. Where appropriate, they were combined with subject strategy adaptations and modifications of the highly sensitive search strategy, designed by the Cochrane Collaboration for identifying randomised controlled trials and controlled clinical trials (as described in Higgins 2011a Chapter 6). Where necessary, we updated our search terms by adding relevant new database controlled vocabulary terms.

We also searched the following trials registries.

- US National Institutes of Health Ongoing Trials Register ClinicalTrials.gov (clinicaltrials.gov; searched 31 January 2017) (Appendix 9);
- World Health Organization Clinical Trials Registry Platform (app.who.int/trialsearch; searched 31 January 2017) (Appendix 9).

Evidence for this review included search results from the previous version of this review (Legg 2006) combined with results from the above searches. In Legg 2006, there were no date limits and searches were applied from inception of databases.

Databases searched in addition to the above, and other differences in searches since the previous review, are reported in Differences between protocol and review.

Searching other resources

We searched the reference lists of papers reporting studies selected for inclusion in this review in order to identify additional relevant trials.

Data collection and analysis

Selection of studies

We downloaded all titles and abstracts retrieved from the electronic searches into reference management software (Endnote). One review author (SL) identified and removed duplicate records. Once duplicate records were removed, one reviewer (SL) uploaded all remaining records into Covidence

(Covidence). Two of three review authors (SL, LL, OSR) independently examined titles and abstracts and removed any obviously irrelevant reports. We obtained full-text reports of potentially relevant reports. At this stage, we attempted to link multiple reports of the same study. Two review authors (SL, LL) examined the full reports for compliance of studies with review eligibility criteria. We resolved differences in opinion regarding trial eligibility through discussion with review coauthors (PL, AD).

Data extraction and management

Two of three review authors (LL, PL, SL) independently extracted data from published reports using a standard data recording form. Where differences occurred between investigators, we resolved these through discussion. We contacted the study authors of three studies to request additional information. We did not contact all trialists, as had been the intention in the original review (Legg 2006).

In studies where a cross-over design was used, we only extracted data from the first treatment phase after randomisation.

Assessment of risk of bias in included studies

We assessed risk of bias using the Cochrane 'Risk of bias' tool (Higgins 2011b). We assessed the methods used in each study to control for the following potential sources of bias: sequence generation (selection bias); allocation concealment (selection bias); blinding of participants, personnel and outcome assessors (performance and detection bias); incomplete outcome data (attrition bias); selective outcome reporting (reporting bias); and other sources of bias.

It was not feasible to blind participants and personnel to the intervention and therefore we agreed to judge all outcomes as having a high risk of performance bias. For detection bias, we considered this by outcome. We judged that all outcomes relating to death were unlikely to be influenced by lack of blinding of outcome assessors and, even if outcome assessors for death were described as not blinded, we judged this bias to be low risk. For detection bias relating to all other outcomes, we considered three aspects from the information presented in the paper: whether the tool that was used to assess the outcome used observation, interview or self-completion (e.g. questionnaire); whether the assessment was made by the participant or an assessor; and whether the assessor was blinded. If the assessment tool involved self-assessment by the participant, we judged detection bias to be unclear because the participant could not be blinded to the intervention and we did not know if lack of blinding would influence participant responses to self-assessment (Higgins 2011b). If the assessment tool was used by an independent assessor and only included observation, we judged detection bias to be low. Where assessment was mixed either by type of assessor, type of tool, or type of outcome, we judged detection bias to be unclear.

For the purpose of this review, a true intention-to-treat analysis was defined as following three principles: 1) participants were kept in the intervention groups to which they were randomised, regardless of the intervention they actually received; 2) there was measured outcome data on all participants; and 3) all randomised participants were included in the analysis (Higgins 2011b). We made judgements on attrition bias from these three criteria.

For reporting bias, we attempted to source prospective registration reports through information presented in study reports or from sifting of clinical trial register searches. We intended to judge bias by comparing prospective registration reports or protocols with outcomes reported in the full report.

Measures of treatment effect

We collected binary data for our outcomes related to death and analysed these using the Peto odds ratio (OR) and 95% confidence interval (CI). We collected continuous data reported as means (with standard deviations) for outcomes relating to activities of daily living, extended activities of daily living, health-related quality of life (participant and carers), mood and distress scores (participant and carers). We calculated the standardised mean difference from continuous data using inverse variance, to account for differences in the assessment tools used to measure the same outcome.

Unit of analysis issues

In the event we had included a trial using a cluster design (in which participants were randomised at group level) we would have used the intra-cluster correlation coefficient (ICC) to estimate the effective sample size (Higgins 2011c).

Dealing with missing data

The primary aim of this review was to obtain standardised data through collaboration with the original investigators. Incomplete data are relatively common in trials of rehabilitation. It is difficult to impute missing values for continuous outcomes. Where data were missing from a published report, we contacted the primary investigators in an attempt to get this information.

Assessment of heterogeneity

We assessed whether there was evidence of inconsistency in our results by considering possible methodological, clinical, and statistical heterogeneity. We assessed clinical and methodological heterogeneity by comparing similarities in our included studies between study designs, participants, interventions, and outcomes.

We assessed statistical heterogeneity by visually examining forest plots, and by performing the Chi^2 test using a P value of less than 0.1 to indicate statistically significant heterogeneity. We used a P value of less than 0.1 rather than the conventional cut-off point of 0.05 because of the low power of this test. We quantified the effect of heterogeneity using the I^2 statistic including its 95% CI. We used the following cut-offs as a guide to interpretation: I^2 at 0% to 40% was not considered important, 30% to 60% suggested moderate heterogeneity, 50% to 90% suggested substantial heterogeneity, and 75% to 100% was considerable heterogeneity (Higgins 2011c).

Assessment of reporting biases

We searched clinical trials registers to identify published protocols for each of our included studies. We intended to compare published protocols with published study results to assess the risk of selective reporting bias. If we had identified sufficient included studies (i.e. more than 10 studies (Higgins 2011a)), we would have generated a funnel plot to assess risk of publication bias in the review; an asymmetrical funnel plot may suggest publication of only positive results (Egger 1997).

We employed a comprehensive search strategy in an effort to avoid reporting biases in our review methodology. See Search methods for identification of studies.

Data synthesis

We completed meta-analysis of outcomes for which we had comparable effect measures from more than one study, and when measures of heterogeneity indicated that pooling of results was appropriate. We used the statistical calculator provided in RevMan (RevMan 5.3) to perform meta-analysis.

We used a fixed-effect model (Mantel 1959). We assessed the robustness of the results to choice of model using sensitivity analysis.

We limited the primary analysis to studies with an overall low or unclear risk of bias. We reached decisions on overall risk of bias per study by consideration of four risk of bias domains: sequence generation, allocation concealment, outcome assessment, and incomplete outcome data. We required a study to have a judgment of low risk of bias in all four domains in order to categorise it as having an overall low risk of bias. We categorised a study that had both low and unclear judgements to have an overall unclear risk of bias. We did not include studies with high risk of bias judgements in these four domains in any of our primary analyses; we reconsidered this decision in sensitivity analysis.

Subgroup analysis and investigation of heterogeneity

If there had been sufficient studies, we would have explored variability in the participants, interventions, and outcomes among studies using the following subgroups:

1. hospital-based occupational therapy interventions versus community-based occupational therapy interventions within three months of stroke onset;
2. single versus multiple staff providing the experimental intervention (Higgins 2011a); and
3. randomisation to treatment within one year of stroke onset versus randomisation to treatment more than one year after stroke onset.

Sensitivity analysis

We explored the potential effects of decisions made as part of the review process as follows.

1. We included all studies regardless of risk of bias judgement.
2. We conducted meta-analysis using the alternate meta-analytical effects model (fixed-effect or random-effects).
3. We conducted a sensitivity to missing data analysis by first adding missing participants to the denominator in the intervention and control groups (missing participants better) and second, adding missing participants to the denominator and the numerator in the intervention and control groups (missing participants worse).

We compared effect estimates from the above results with effect estimates from the main analysis. We aimed to report differences that altered interpretation of effects.

We performed sensitivity analyses, where appropriate, on the following outcomes:

1. performance in activities of daily living;
2. odds of poor outcome (death and deterioration or death and dependency).

GRADE and 'Summary of findings'

We assessed the overall quality of the evidence for our outcome using the GRADE (Grades of Recommendation, Assessment, Development and Evaluation Working Group) approach, as recommended in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011d). The quality of the evidence for a specific outcome is based on the performance of the studies against five criteria: study design and limitations, directness of evidence, consistency of results, precision (sufficient data), and reporting of results across all studies that measure a specific outcome. This approach yields an overall measure of how confident we can be that our estimate of effect is correct (Guyatt 2008). We used the principles of the GRADE system to prepare an overall assessment of evidence related to each of the following outcomes.

1. Performance in activities of daily living.
2. Death or 'poor outcome' (deterioration or dependency).
3. Extended activities of daily living.
4. Mood or distress

We (LL and SL) independently used GRADEpro software (http://www.guidelinedevelopment.org/) to create a 'Summary of findings' table for each comparison. We reached consensus and resolved disagreements by consulting a third review author, if required.

Study design and limitations refers to the results of the 'risk of bias' assessment (Assessment of risk of bias in included studies). Directness of evidence refers to the comparability of population, interventions, and outcomes of interest in the included studies. We described any concerns regarding comparability of the included studies. Consistency of results refers to similarity in treatment effect in results across the included studies and includes the direction and size of effect and statistical significance. We considered overlap of confidence intervals to indicate statistical homogeneity. We also used the Chi^2 test of significance for heterogeneity using a P value of less than 0.10 to indicate statistical significance and used I^2 as an index of heterogeneity. Precision refers to the effect of study size on the precision of the estimate of treatment effect. For each outcome, we noted the sample size and magnitude and direction of the experimental intervention's effect compared with the control intervention - specifically the width of the confidence interval surrounding the estimate i.e. whether the width was narrow indicating more precision) or wider (indicating more uncertainty) (Higgins 2011d). Publication bias refers to the likelihood of selective publication of studies or outcomes. Had there been a sufficient number of studies we would have assessed probability of selective outcome reporting as part of the assessment of risk of bias using funnel plots as visual tools for examining publication and other bias (i.e. small study effects).

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies

Results of the search

For this update, we screened 38,671 references from database searches and accessed the available full-text reports for 32 studies. We screened 191 studies in the Cochrane Stroke Group Trials Register and accessed the available full-text reports for three studies. We screened 1069 reports from clinical trial registers and 116 reports available from grey literature searching.

We considered nine studies identified as eligible in the previous version of this review and considered two studies that were awaiting classification in the previous version (Legg 2006).

The flow of search results for the previous version of the review are reported in Legg 2006. We reported details of the search for this update in a PRISMA flow chart. See Figure 1.

Figure 1. Flow diagram of search conducted in January 2017.

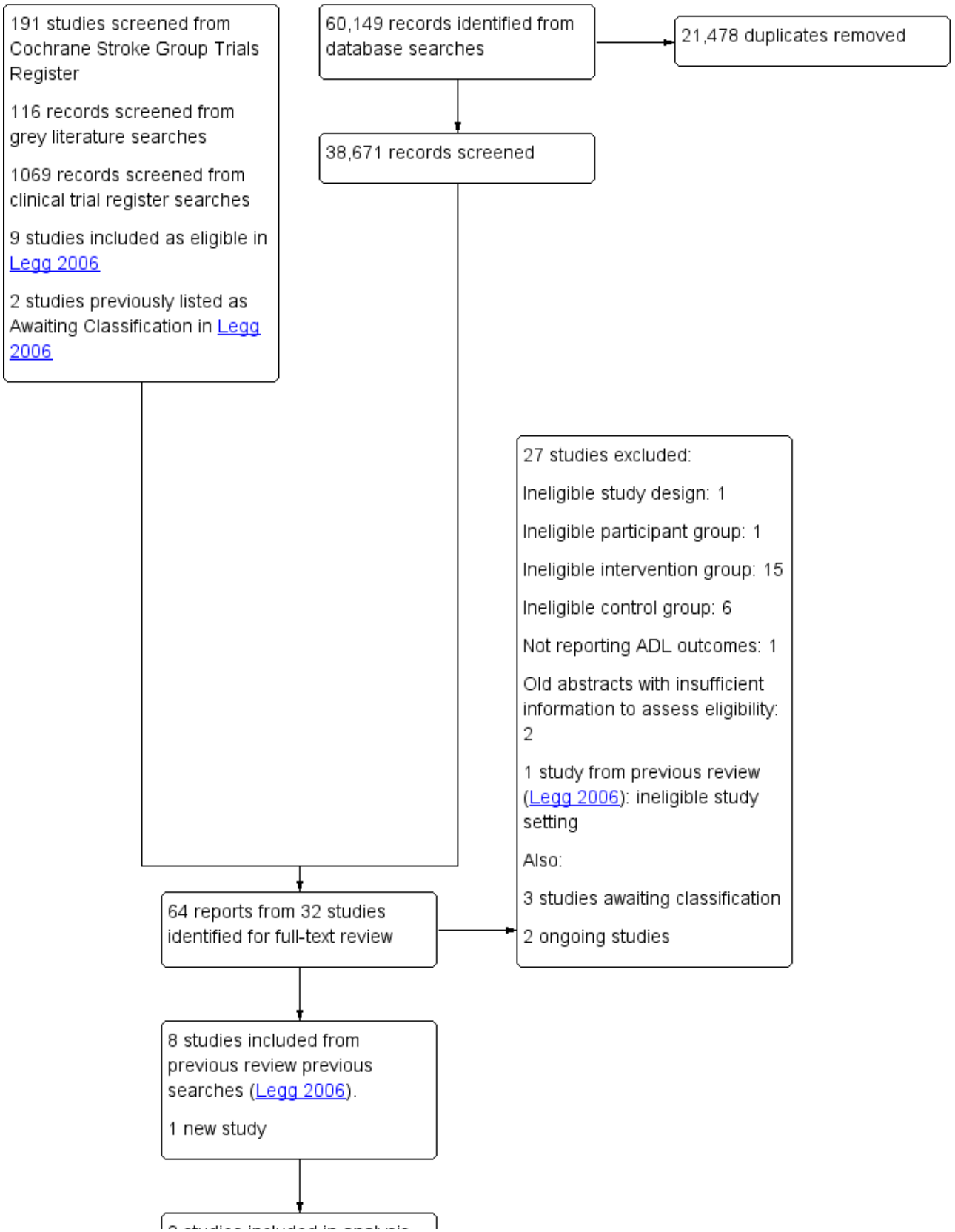
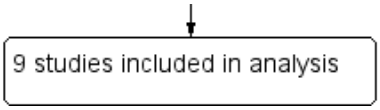


Figure 1. (Continued)



Included studies

The previous version of this review identified nine eligible studies (Chui 2004; Corr 1995; Drummond 1996; Gilbertson 2000; Logan 1997; Parker 2001; Sackley 2004; Walker 1996; Walker 1999) and we excluded one of these studies in this review (Sackley 2004). See Excluded studies. We identified one eligible study from the 2017 search in addition to the eight studies above (Radomski 2007). Included studies had a total of 994 randomised participants.

All studies included adult stroke participants who were randomised to receive an occupational therapy intervention following discharge from hospital or an inpatient facility. Mean age of participants ranged from 55 to 87.5 years. One study used the World Health Organization (WHO) definition of stroke (Parker 2001), and four studies used a clinical definition of stroke (Corr 1995; Gilbertson 2000; Logan 1997; Walker 1999). Remaining studies did not specify a definition of stroke. Four trials provided information on baseline Barthel Index scores for participants (Corr 1995; Gilbertson 2000; Parker 2001; Walker 1999).

All interventions were carried out by occupational therapists and involved practice in skills of activities of daily living; one study specifically provided assistive devices for bathing (Chui 2004). The comparison groups were described as: no intervention (Chui 2004; Radomski 2007), no occupational therapy (Parker 2001; Walker 1996; Walker 1999), and usual care (Corr 1995; Drummond 1996; Gilbertson 2000; Logan 1997).

Eight out of nine occupational therapy interventions were provided by a single intervening occupational therapist; the studies were, in effect, testing the effects of one occupational therapist (Chui 2004; Corr 1995; Drummond 1996; Gilbertson 2000; Logan 1997; Radomski 2007; Walker 1996; Walker 1999). One trial delivered the occupational therapy intervention via multiple occupational therapists (Parker 2001).

Five studies used the Barthel index to measure ADL (Corr 1995; Gilbertson 2000; Logan 1997; Parker 2001; Walker 1999), two studies used the self-care section of the Rivermead activities of daily living scale (Drummond 1996; Walker 1996), and two studies used the Functional Independence Measure (FIM) (Chui 2004; Radomski 2007).

We identified three studies that had two active comparison arms versus usual care (Drummond 1996; Parker 2001; Radomski 2007). For the purpose of this review, we included data from the active comparison arm that specifically involved ADL.

We contacted study authors to request additional information (Drummond 1996; Radomski 2007); data for the ADL group alone were no longer available for one study (Drummond 1996) and we were not able to include this study in the data analysis. One of the review authors (PL) had a copy of the original data for Parker 2001.

Excluded studies

In total, we excluded 27 studies.

We excluded one study that was previously included but was no longer eligible for this review, as the intervention was based in a nursing home environment (Sackley 2004). We excluded two studies (Stalhandske 1997; Sun 2001) listed as 'awaiting classification' in the previous version of this review (Legg 2006). These were published as abstracts with insufficient information to assess eligibility and, owing to the length of time since the study abstract was published, we have now excluded these.

We excluded 24 studies identified during the searches of databases, clinical trials registers, and the Cochrane Stroke Group Trials Register (Abizanda 2011; Andrea 2003; Bai 2012; Chaiyawat 2012; Cross 2014; Desrosiers 2007; Egan 2007;Guidetti 2011; Jing 2006; Kessler 2014; Landi 2006; Li 2008; Park 2011; Rasmussen 2016; Rodgers 2015; Sahebalzamani 2009; Skidmore 2012; Skidmore 2016; Tuncay 2006; Walker 2012; Whitehead 2016; Yu 2009; Zhang 2008a; Zhu 2007).

Reasons for excluding studies from search results were:

- ineligible type of study (Cross 2014);
- ineligible type of participant: in which less than 50% participants were adults with stroke (Abizanda 2011);
- ineligible type of intervention: intervention treated a specific impairment (Skidmore 2016; Park 2011; Skidmore 2012; Walker 2012); intervention not performed by an occupational therapist (Andrea 2003; Chaiyawat 2012; Sahebalzamani 2009; Tuncay 2006; Yu 2009; Zhang 2008a); intervention performed by an occupational therapist as part of a multidisciplinary team (Bai 2012; Rasmussen 2016; Rodgers 2015; Zhu 2007); the intervention was a very specific therapeutic approach (Kessler 2014);
- ineligible type of control group: intervention versus an active comparator (Desrosiers 2007; Guidetti 2011; Jing 2006; Landi 2006; Li 2008; Whitehead 2016);
- did not report ADL outcomes (Egan 2007).

See Characteristics of excluded studies for studies excluded during the 2017 update. Studies excluded in previous searches are listed in Legg 2006.

Ongoing studies

We identified two ongoing studies from the clinical trials register searches (NCT02802956; NCT02925637). See Characteristics of ongoing studies.

Studies awaiting classification

We were unable to assess review eligibility for three studies that were published as abstracts and included insufficient detail (Bai 2008; Chan 2012; Zhang 2008b). See Characteristics of studies awaiting classification.

Risk of bias in included studies

See Figure 2 and Figure 3

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

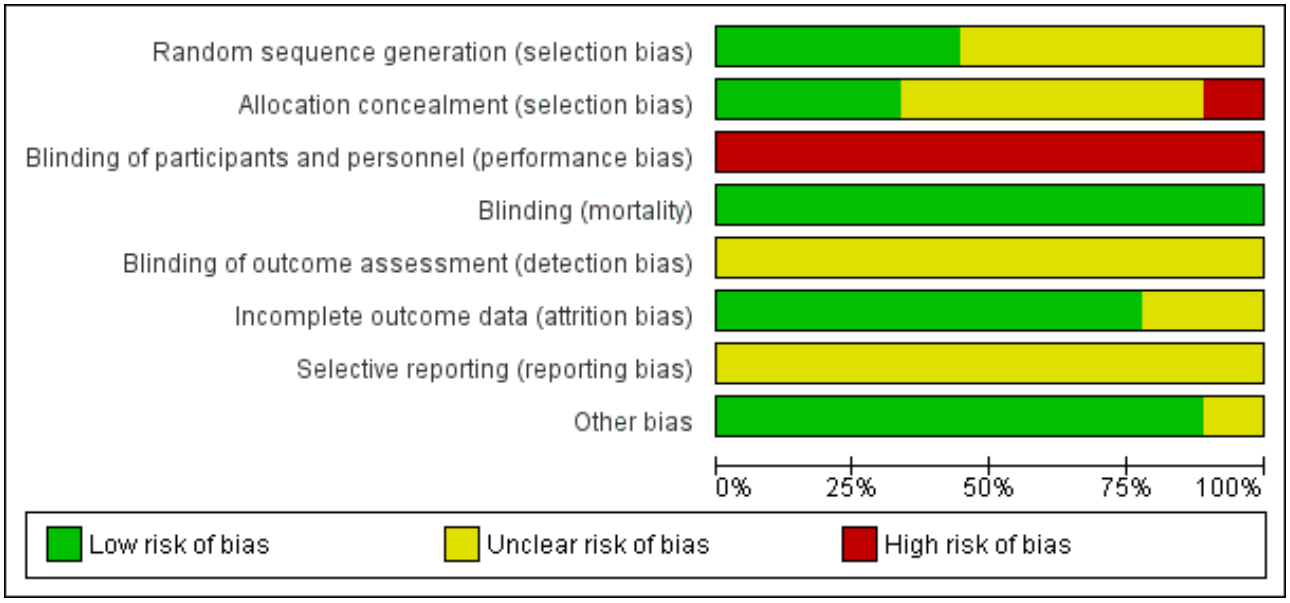
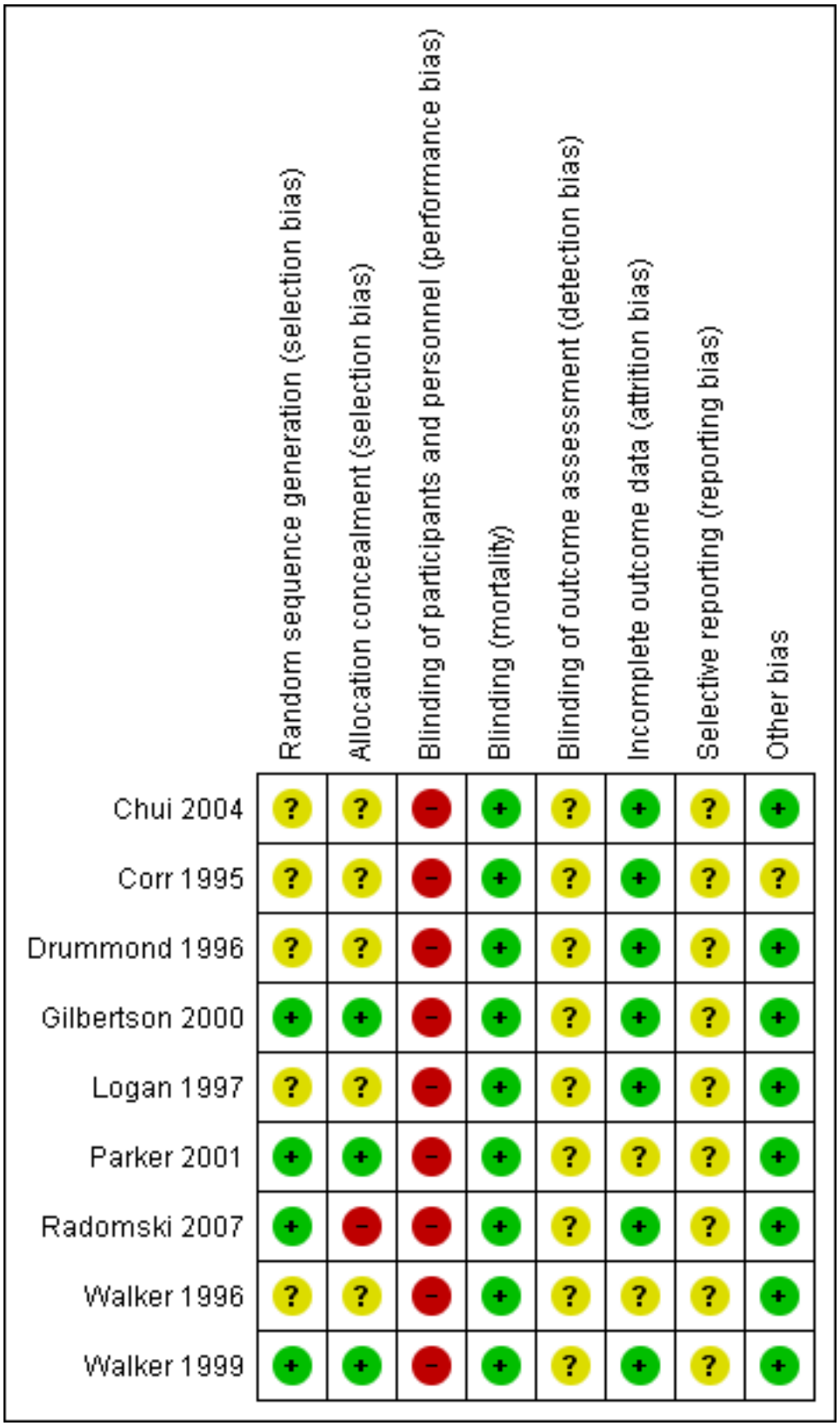


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



Allocation

All studies were described as randomised, with four study reports providing an adequate description of method of randomisation (Gilbertson 2000; Parker 2001; Radomski 2007; Walker 1999). Of these, three had also provided an adequate description of the method used to conceal group assignment from study investigators or personnel (Gilbertson 2000; Parker 2001; Walker 1999). One study described a method that could have revealed the next assignment to the investigator and we judged this to have high risk of bias (Radomski 2007). The remaining studies did not provide sufficient information for us to judge risk of selection bias.

Blinding

It is not feasible to prevent study personnel, participants, or caregivers from knowing that an occupational therapy intervention was received; we judged all studies to have high risk of performance bias.

Six studies did not report how data on death were obtained (Chui 2004; Drummond 1996; Gilbertson 2000; Logan 1997; Radomski 2007; Walker 1996). One study provided insufficient information on how data on death were obtained (Parker 2001). One study used an independent researcher to gather data on death (Corr 1995). We did not consider lack of blinding would influence outcome data for mortality and therefore judged all studies to be at low risk of detection bias for all outcomes relating to death.

For all other outcomes, we considered the type of assessment tool, who carried out the assessment and how, and whether, the assessor was blinded to participant allocation.

One study used an outcome measure (FIM) designed to be administered by a trained and certified assessor; however, the study authors did not report if the observers were blinded and therefore we judged this study to have unclear risk of bias (Chui 2004). Five studies did not report how the outcome evaluation data were collected (i.e. by objective observation or obtained directly from participants through interview or self-completed questionnaire); these studies did not provide us with sufficient information to judge risk of bias (Drummond 1996; Gilbertson 2000; Logan 1997; Walker 1996; Walker 1999).

Two studies reported that performance in ADL outcome data were collected directly from participants through self-completed postal questionnaires (Corr 1995; Parker 2001). One study reported that approximately 34% of participant-reported outcomes were completed by carers (Parker 2001). One study used a blinded outcome assessor to collect FIM data directly from the participant through telephone interview (Radomski 2007). As knowledge of the assigned intervention may impact on participant-reported outcomes, we judged these to have unclear risk of bias.

Incomplete outcome data

Two studies reported no missing outcome data (Chui 2004; Radomski 2007). Five studies reported similar numbers for missing outcome data across groups and similar reasons for missing data (Corr 1995; Drummond 1996; Gilbertson 2000; Logan 1997; Walker 1999). One study reported similar numbers for missing outcome data across groups but did not give reasons for non response and therefore we judged this to have unclear risk of bias (Parker 2001). One study did not provide information on the number of participants at each stage of the study (Walker 1996).

Selective reporting

None of the included studies provided details of prospective registration with clinical trial registers or references for prospectively written study protocols; it was not feasible to judge risk of reporting bias for all studies.

Other potential sources of bias

We noted some gender imbalances between groups in one study (Corr 1995). We did not know if this had the potential to influence study results; we judged this study to have unclear risk of bias. We identified no other sources of bias in the remaining studies.

Overall risk of bias

None of the studies had an overall low risk of bias (i.e. no studies had low risk of bias in each of four domains: sequence generation, allocation concealment, outcome assessment, incomplete outcome data). One study had an overall high risk of bias, with high risk of bias in one of these four domains (Radomski 2007). Remaining studies had an overall unclear risk of bias (i.e. with assessments of both low and unclear risk in each of the four domains).

Effects of interventions

See: **Summary of findings for the main comparison** Occupational therapy compared to usual or no care for stroke

Primary outcomes

Personal activities of daily living

Eight of the nine included studies reported a measure of personal ADL; data from Radomski 2007 was not included because it had an overall high risk of bias. We combined data for studies with an overall unclear risk of bias for the outcome of personal activities for daily living using a standardised mean difference (SMD) with a fixed-effect model (SMD 0.17 (95% CI 0.03 to 0.31); P = 0.02; 7 studies; 749 participants; low-quality evidence) with no significant heterogeneity (Chi^2 = 4.74, df = 6 (P = 0.58); I^2 = 0%). Therefore, participants who received an occupational therapy intervention after stroke were more independent in personal activities of daily living than those participants who received no intervention or standard care/practice. See Table 1 for information about completeness of data. See Analysis 1.1 and Summary of findings for the main comparison.

Death or a poor outcome

We combined data for studies with an overall unclear risk of bias for the combined odds of death or a poor outcome (dead and deteriorated or dead and dependent) using the Peto odds ratio (OR 0.71, (95% CI 0.52 to 0.96); P = 0.03; 5 studies; 771 participants; low-quality evidence) with no statistically significant heterogeneity between studies (Chi^2 = 3.12, df = 4 (P = 0.54); I^2 = 0%). Therefore, participants who received an occupational therapy intervention after stroke were less likely to experience a poor outcome compared to those participants who received no intervention or standard care/practice (Analysis 1.2; Summary of findings for the main comparison). For information about completeness of data see Table 2.

Secondary outcomes

Death

We combined data for all studies with an overall unclear risk of bias for the odds of being dead at the end of scheduled follow-up using the Peto odds ratio OR 1.02 (95% CI 0.65 to 1.61); P = 0.39; P = 0.93; 8 studies; 950 participants). This result did not provide evidence of either benefit or harm. We identified no significant statistical heterogeneity between trials (Chi^2 = 1.42, df = 4 (P = 0.84); I^2 = 0%). There was no difference in the odds of death between the group who received the occupational therapy intervention and those who received no intervention or standard care/practice (Analysis 1.3). For information about completeness of data see Table 3.

Death or institutional care

We combined data for all studies with an overall unclear risk of bias for the odds of being dead or requiring institutional care at the end of scheduled follow-up using the Peto odds ratio (OR 0.89 (95% CI 0.60 to 1.32); P = 0.55; P = 0.93; 4 studies; 671 participants). This result did not provide evidence of either benefit or harm. There was no significant heterogeneity between trials (Chi^2 = 4.03, df = 3 (P = 0.26); I^2 = 26%; Analysis 1.4). For information about completeness of data see Table 4.

Death or dependency

We combined data for all studies with an overall unclear risk of bias for the odds of being dead or dependent at the end of scheduled follow-up using the Peto odds ratio (OR 0.89 (95% CI 0.64 to 1.23); P = 0.47; 4 trials; 659 participants). There was moderate heterogeneity between trials Chi^2 = 4.50, df = 3 (P = 0.21); I^2 = 33%). There was no difference in the combined odds of death or dependency between the group who received the occupational therapy intervention and those who received no intervention or standard care/practice (Analysis 1.5). For information about completeness of data see Table 5.

Extended activities of daily living

We excluded Radomski 2007 because it had an overall high risk of bias. We combined data for studies with an overall unclear risk of bias for the outcome of extended activities for daily living using SMD with a fixed-effect model (SMD 0.22 (95% CI 0.07 to 0.37); P = 0.005; 5 studies; 665 participants; low-quality evidence) with no significant heterogeneity (Chi^2 = 4.96, df = 4 (P = 0.29); I^2 = 19%). Therefore, participants who received an occupational therapy intervention after stroke were more independent in extended activities of daily living than those participants who received no intervention or standard care/practice (Analysis 1.6). For information about completeness of data see Table 6.

Health-related quality of life

One study (108 participants) reported outcome data for health-related quality of life (Gilbertson 2000). The study authors reported no difference in health-related quality of life for participants who received occupational therapy compared with those who received standard care/practice. For information about completeness of data see Table 7.

Mood or distress

We combined data for studies with an overall unclear risk of bias for the outcome mood or distress using SMD with a fixed-effect model (SMD 0.08 (95% CI -0.09 to 0.26); P = 0.35; 4 studies; 519 participants) with no significant heterogeneity (Chi^2 = 3.31, df = 3 (P = 0.35); I^2 = 9%). Therefore, there was no evidence of an improvement in mood between those participants receiving occupational therapy interventions and those receiving no intervention or standard care/practice (Analysis 1.7). For information about completeness of data see Table 8.

Unpaid carers: mood or distress

We found no studies that explicitly reported inclusion of consenting and recruiting unpaid carers that collected data on mood or distress.

Unpaid carers: health-related quality of life

We found no studies that explicitly reported inclusion of consenting and recruiting unpaid carers that collected data on health-related quality of life.

Satisfaction with services

One study collected information on participant and carer satisfaction with services (Gilbertson 2000). The measurement tool was not validated and data were unclearly reported. We did not contact the author for clarification.

Subgroup analysis by intervention characteristic

We did not perform subgroup analyses according to intervention characteristics.

1. We found no studies comparing hospital-based occupational therapy interventions with community-based occupational therapy interventions. All studies were community based.
2. Only one study tested multiple staff providing the occupational therapy intervention (Parker 2001); the remaining studies tested single occupational therapist interventions.
3. All eligible studies randomised participants to treatment within one year of stroke onset.

Sensitivity analyses

Inclusion of all studies regardless of risk of bias judgement

For outcome performance in activities of daily living, when we included all studies regardless of risk of bias judgement there was no change to interpretation of the result, with improved independence in activities of daily living for participants who had received an occupational therapy intervention (SMD 0.16 (95% CI 0.02 to 0.30; P = 0.03; 8 studies; 759 participants; fixed-effect model).

We judged all studies included in our second primary outcome (death or 'poor outcome') to have an overall unclear risk of bias; there were no alternative data to analyse in sensitivity analysis for this outcome.

Meta-analysis using the alternate meta-analytical effects model (fixed-effect or random-effects).

Reanalysis of the data for our primary outcomes (personal activities of daily living, and death or poor outcome) using the random-effects analysis model did not alter the result.

Sensitivity to missing data.

If we assumed that the participants who were missing from the intervention groups (40/425 (9.4%)) and control groups (47/432 (10.9%) were alive and well and living at home, then the odds of a poor outcome was still reduced for those participants receiving occupational therapy interventions (OR 0.75 (95% CI 0.56 to 1.00); P = 0.05) with no statistically significant heterogeneity (Chi^2 = 3.36, df = 4 (P = 0.50); I^2 = 0%). Alternatively, when we considered participants who were missing from the intervention groups and control groups to be either dead or having a poor outcome (deterioration or dependency), then the odds of a poor outcome was still reduced for those participants receiving occupational therapy interventions (OR 0.75 (95% CI 0.56 to 0.99); P = 0.04) with no statistically significant heterogeneity (Chi^2 = 3.06, df = 4 (P = 0.55); I^2 = 0%) (Analysis 1.8; Analysis 1.9).

DISCUSSION

Summary of main results

For this update, we included nine studies with 994 participants.

We found that occupational therapy delivered to adults after stroke and targeted towards activities of daily living increased ADL scores and reduced the risk of poor outcome (the combined odds of death and deterioration or dependency in activities of daily living). We also found that those who received occupational therapy were more independent in extended activities of daily living. Occupational therapy did not influence mortality or reduce the combined odds of death and dependency, death and deterioration or death and institutionalisation; however, data were incomplete and only available for a few studies. Occupational therapy did not improve mood or distress scores. There were insufficient data to determine the effects of occupational therapy on health-related quality of life. We found no studies of consenting unpaid carers prior to study participation and therefore there were no carer-related outcomes in our review. There were insufficient data to determine participants' and carers' satisfaction with services.

We used GRADEpro to assess the quality of our evidence for the outcomes: personal activities of daily living, death or a poor outcome, or extended activities of daily living. We judged the evidence to be low-quality.

Overall completeness and applicability of evidence

We conducted a thorough search, including searches of grey literature and clinical trial registers. Included studies all compared an occupational therapy intervention with no intervention or standard care/practice, and included participants who were adults with stroke. We excluded studies that used occupational therapy as part of multidisciplinary approach, although therapy may typically be received as part of a multidisciplinary process. Studies were published from 1995 to 2017, with seven studies based in the UK, one in the US, and one in Hong Kong. All studies were directly applicable to our review objective.

Whilst the studies were all appropriate, we identified few trials with few participants and we considered that such limited data led to imprecision in the effect estimates for our primary outcomes and the effect on extended activities of daily living. We used GRADEpro to downgrade the quality of our evidence due to this imprecision.

Quality of the evidence

We used the 'Risk of bias' tool to assess study methodology. Reporting methods used by study authors were often incomplete. Only three of the nine studies described both a suitable method of randomisation and method of allocation concealment. There was inevitable high risk of performance bias in all studies as personnel and participants could not be blinded to their group allocation. We did not consider that lack of blinding of outcome assessors for outcomes relating to death would influence assessment. However, we gave careful consideration to the assessment of all other outcomes: we considered the variety of assessment tools, including observation, participant self-assessment, completion of questionnaires and telephone interviews, used by outcome assessors. Whilst some study authors reported that outcomes assessors were independent, we were not able to judge whether any of the studies were at a low or high risk of detection bias because of the methods used to assess outcomes and the lack of blinding of participants. Although some study authors reported loss of participants, this was balanced between groups and we judged most studies to have a low risk of attrition bias. No included studies provided details of prospective trial registration and we could not judge risk of selective outcome reporting bias.

We used GRADEpro to downgrade the quality of our evidence due to study limitations.

Potential biases in the review process

We conducted the review using robust Cochrane methodology, with two review authors independently assessing studies for eligibility, extracting data, and carrying out 'risk of bias' assessment.

We made some changes to the review during this update. We altered the inclusion criteria so that studies that were carried out in nursing homes were no longer eligible; this removed one previously included study which is included in another Cochrane review. We reviewed the decision to include data from carers who had not consented to participate; we did not conduct any analysis on any carer-related outcomes. We reviewed the decision to combine data in multi-arm studies; we only used data from the intervention arm that was closest to the review objectives but we no longer had available data for one study. We reviewed the decision to include all studies in meta-analysis; we only included studies that had an overall low or unclear risk of bias.

We made these changes to the review in order to increase the robustness of our evidence. We assessed the decision regarding inclusion of only studies with low or unclear risk of bias in sensitivity analysis and results were not changed. Comparing the effect estimates in the 2017 update with those in the original review do not suggest that our decisions have introduced bias.

Agreements and disagreements with other studies or reviews

We found one systematic review, Reinsperger 2012, published in German, that had reported the methods and results of the original occupational therapy review (Legg 2006) and provided an update of the original review. The review authors searched for and included new studies. The studies identified by Reinsperger 2012 did not meet our review inclusion criteria. Further, the authors failed to identify many of the studies that were potential studies for

inclusion. The authors concluded that occupational therapy led to an improvement in outcomes for adults after stroke; this review did not include an assessment of quality of the evidence using GRADE.

AUTHORS' CONCLUSIONS

Implications for practice

Occupational therapy does appear to improve performance in activities of daily living and reduce the odds of deterioration in those abilities. We assessed the quality of the evidence as low and as such our confidence in the effect estimates is limited and the true effect may be substantially different from our estimates. Further evidence as to the clinical and cost effectiveness of occupational therapy interventions after stroke is required as, due to the quality of evidence, the current data support the provision of occupational therapy but the confidence in this is limited and could be overturned by further trials.

Implications for research

The majority of studies included in this review test the effects of a single occupational therapist working with adults with stroke to improve ADL; these trial therapists may or may not be representative of the broader occupational therapy workforce. Good quality, large, multiple therapist, no intervention or standard care/practice comparator randomised controlled studies are required to establish the clinical and cost effectiveness of occupational therapy after stroke. Occupational therapists operate in hospital-based specialist stroke services, in non-specialist setting serving stroke patients and in community settings and therefore studies should be conducted across a range of sites with the results stratified and interpreted by site. Studies, with clearly reported methods, should be focused on areas where occupational therapy may deliver significant clinical benefits through improved performance in ADL, or cost effectiveness benefits through faster rehabilitation and discharge.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Chui 2004

Methods	RCT
Participants	Hong Kong Total number of randomised participants: 53 Mean age: 72.1 years 66% men BI score at baseline: not available Definition of stroke: unclear Recruitment: inpatients and outpatients who had been discharged from hospital for less than 2 weeks Inclusion criteria: aged over 55, diagnosis of stroke; able to follow instructions; able to communicate using speech; family support at home; required bathing device
Interventions	Additional home-based intervention in the use of bathing devices (n = 30) versus no intervention (n = 23)
Outcomes	Outcomes were recorded at 3 months after discharge Relevant review outcomes: ADL (measured using FIM) (study authors did not report who carried out assessment); and death at end of follow-up Study authors also report: users evaluation of satisfaction with AT
Notes	Funding sources/Declarations of interest: not reported Study dates: not reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"Subjects in need of bathing devices were randomly assigned to the two groups. The occupational therapists, who were involved in the random assignment procedures, were blind to the study's purpose" Insufficient information about the sequence generation process to permit judgement of yes or no

Chui 2004 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	"The occupational therapists, who were involved in the random assignment procedures, were blind to the study's purpose" Method of concealment was not described
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcome reported using FIM. Study authors did not state who carried out FIM assessments and whether they were blinded. Insufficient information to permit judgement of 'low risk' or 'high risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	No apparent loss of data. No reports of attrition due to death
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias were identified

Corr 1995

Methods	RCT
Participants	UK Total number of participants randomised: 110 Mean age: 75.5 years 37% men BI score at baseline: intervention group median 15 (IQR 2 to 20); control group median 14 (IQR 0 to 20) Definition of stroke: clinical definition of stroke Recruitment: participants recruited prior to discharge from inpatient facility Inclusion criteria: discharged alive from 1 of 2 units regardless of discharge destination
Interventions	Rehabilitation at home by occupational therapists versus usual care. Input at 2, 8, 16 and 24 weeks. Intervention based on the model of human occupation. Interventions included: teaching new skills; facilitating more independence in activities of daily living; facilitating return of function; enabling participants to use equipment supplied by other agencies; information provision to participant and carer; referring to or liaison with other agencies. Service provided by a qualified occupational therapist
Outcomes	Outcomes were recorded at 12 months Relevant review outcomes: ADL (assessed using BI, completion of postal questionnaire by participant), death, extended ADL (assessed using Nottingham Extended ADL Index, completion of postal questionnaire by participant), mood or distress scores (assessed using Geriatric Depression Scale, completion of postal questionnaire by participant), HRQOL (Pearlman's 6-point Quality of Life Scale) carers' quality of life (assessed using Pearlman's 6-point Quality of Life Scale) Follow-up period used in analysis: 12 months
Notes	Funding sources/declarations of interest: 1 author received funding from the Stroke Association Study dates: April 1991 to January 1992

Corr 1995 *(Continued)*

	Note: Not explicit that unpaid carers were consented and recruited at baseline. Therefore, we did not perform analysis on carer-reported outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Participants were randomly allocated to either a control or intervention group. Allocation was carried out by an administrative assistant not otherwise involved with participant care or management, using a predetermined code in individual sealed envelopes; unclear how predetermined code was generated
Allocation concealment (selection bias)	Unclear risk	Participants were randomly allocated to either a control or intervention group. Allocation was carried out by an administrative assistant not otherwise involved with participant care or management, using a predetermined code in individual sealed envelopes. The method of concealment was not described in sufficient detail to allow a definite judgement – the use of sealed assignment envelopes was described but it remained unclear whether envelopes were opaque and sequentially numbered
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind participants and personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	"The status (dead or alive) ... was determined at one year post stroke by a research assistant, not otherwise involved with the patients, by contact with the patients' general practitioner."
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (BI): participant-reported, completion of postal questionnaire EADL (measured using Nottingham Extended ADL Index): participant-reported, completion of postal questionnaire; mood or distress scores (measured using Geriatric Depression Scale) participant-reported, completion of postal questionnaire HRQOL (assessed by Pearlman's 6-point Quality of Life Scale): participant-reported, completion of postal questionnaire; carers' quality of life (assessed using Pearlman's 6-point Quality of Life Scale): carer-reported, completion of postal questionnaire Follow-up period used in analysis: 12 months Knowledge of the assigned intervention (see performance bias above, blinding of participants and personnel) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)
Incomplete outcome data (attrition bias) All outcomes	Low risk	At 1 year, 9/55 of the intervention group were dead and 11/55 of the control group were dead. Of those who were alive, 46/55 of the intervention group and 43/55 of the control group returned their questionnaires. 1 person in the control group moved away and was lost to follow-up. Missing outcome data balanced in numbers across groups with same reason for missing data
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'.

Corr 1995 *(Continued)*

Other bias	Unclear risk	Significant gender imbalance at baseline. Unclear if gender might influence response to intervention and outcome data

Drummond 1996

Methods	RCT
Participants	UK Total number of randomised participants: 44 (note: Drummond 1996 included an additional intervention arm with 21 participants who were supported with leisure activities. Participants in the leisure intervention arm were not included in this review update. See Differences between protocol and review) Mean age: 66 years 57% men Definition of stroke: not reported. Participants recruited at discharge from inpatient facility Inclusion criteria: admitted to City Hospital Nottingham Stroke Unit Exclusion criteria: severe comprehension difficulties i.e. score < 3 on Speech Therapy Boston Diagnostic Aphasic Examination; a documented history of dementia; no English language
Interventions	• Conventional occupational therapy (n = 21): participants were seen by OT for a minimum of 30 minutes per week for 12 weeks after discharge from hospital and 30 minutes every 14 days for the next 12 weeks. The focus was practice of activities of daily living (washing, dressing, transfers) and where appropriate, treatment of perceptual problems • No additional occupational therapy over usual care from health or social services (n = 23)
Outcomes	Outcomes were recorded at 3/6 months: ADL (assessed by Rivermead ADL self-care section), EADL (assessed by Nottingham EADL), mood/distress scores (assessed by Wakefield Depression) and HRQOL (assessed by Nottingham HealthProfile) Study authors also reported the number and amount of time spent in leisure activities (assessed by Nottingham Leisure Questionnaire) Follow-up period used in analysis: 6 months Knowledge of the assigned intervention (see performance bias above, blinding of participants and personnel) may have impacted on participant-reported outcomes and we were unable to judge whether this would have influenced outcome data (Higgins 2011b)
Notes	Funding sources/declarations of interest: funding from the Stroke Association and the Nottingham Fights Stroke Association Study dates: 30 October 1990 to 31 July 1992 Note: data included in the previous review (Legg 2006) were unpublished data from the study authors. We attempted to source the data for the single-pair wise comparison for this update; the data were no longer available and we were not able to include outcome data for the single intervention arm for all outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"... subjects were randomly allocated to one of the three study groups using restricted randomisation."

Drummond 1996 *(Continued)*

		However, the study authors did not provide sufficient information on the methods used to control the random allocation procedure to permit judgement of 'low risk' or 'high risk'
Allocation concealment (selection bias)	Unclear risk	"Sealed envelopes were opened by administrative staff who then indicated to which group a subject was to be assigned." Unclear if assignment envelopes were opaque and sequentially numbered
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by Rivermead ADL self-care section, unclear if completed by independent assessor using objective observation or participant-reported (interview or completion of questionnaire) EADL (measured by Nottingham EADL): participant-reported - unclear if interview or self-completed questionnaire Mood or distress scores (measured by Wakefield Depression Inventory): participant-reported: unclear if interview or self-completed questionnaire HRQOL (measured by Nottingham Health Profile): participant-reported: unclear if interview or self-completed questionnaire "At three and six months from the date of discharge, all subjects were visited by an independent assessor who did not know to which group they had been allocated." HRQOL and mood were participant-reported outcomes. Unclear how ADL and EADL data were obtained e.g. objective observation or participant-reported (interview or completion of questionnaire) Follow-up period used in analysis: 6 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Difficult to work out who was missing from what group and why. However, numbers missing at 6 months, were 1 (group 1) and 3 (group 2)
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'. Only data for the Nottingham Leisure Questionnaire were presented for each of the groups. There was selective reporting of comparisons of intervention arms for Nottingham EADL, Nottingham Health Profile, and Wakefield Depression Inventory
Other bias	Low risk	No other sources of risk were identified

Gilbertson 2000

Methods	RCT
Participants	UK Total number of participants randomised: 138 Median age: 69 years 45% men BI score at baseline: intervention group median 17 (IQR 15 -18); control group median 18 (IQR 16 - 19) Definition of stroke: clinical definition of stroke Recruitment: participants recruited when discharged from hospital and a date was set Inclusion criteria: discharged to a private address; willing to cooperate; consent Exclusion: made a full recovery; discharged to institutional care; terminally ill; lived outside catchment area; severe cognitive or communication difficulties preventing consent, goal setting, or completing outcome measures.
Interventions	• Domiciliary occupational therapy: provided for a period of six weeks (n = 67). Frequency approximately 1.7 visits per week lasting between 30 to 45 minutes. Client-centred occupational therapy programme. Liaison with other agencies. Occupational therapy provided by a qualified occupational therapist • Routine services: including inpatient multidisciplinary rehabilitation, pre-discharge home visit for a select group of participants, equipment, referral to support services, multidisciplinary review at stroke clinic on regular basis, day hospital stroke survivors who were suitable (n = 71)
Outcomes	Outcomes were recorded at 7 weeks/6 months Relevant review outcomes: performance in ADL (measured by BI), performance in EADL (measured by Nottingham Extended Activities of Daily Living); death or deterioration (death or deterioration in BI scores); HRQOL (measured by European Quality of Life Questionnaire: EUROQOL); carer mood (measured by General Health Questionnaire); satisfaction with outpatient services Study authors also reported: Canadian Occupational Performance Measure, resource use (staff time, hospital readmission, provision of equipment and services) Follow-up period used in analysis: 6 months
Notes	Funding sources/declarations of interest: funding from Chest Heart and Stroke Scotland. Additional support from Glasgow Royal Infirmary NHS Trust and the Chief Scientist Office, Scottish Office, which funded a research training fellowship for 1 author Study dates: not reported Note: not explicit that unpaid carers were consented and recruited at baseline. Therefore, we did not perform analysis on carer-reported outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Computer-generated schedule"
Allocation concealment (selection bias)	Low risk	"Sequentially-numbered opaque sealed envelopes"
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention

Gilbertson 2000 *(Continued)*

Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by BI, unclear if completed by outcome assessor by observation, interview or participant-completed questionnaire) EADL (measured by Nottingham Extended Activities of Daily Living); participant-reported - unclear if interview or self-completed questionnaire HRQOL (measured by European Quality of Life Questionnaire: EUROQOL); participant-reported - unclear if interview or self-completed questionnaire Carer mood (measured by General Health Questionnaire): carer-reported - unclear if interview or self-completed questionnaire "The outcome assessor who was blinded to treatment allocation, was based in a separate department from the research therapist." Follow-up period used in analysis: 12 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)
Incomplete outcome data (attrition bias) All outcomes	Low risk	At 6 months, primary outcome data (Nottingham Extended Activities of Daily Living) were available for 60/67 of the intervention group. The reasons for attrition (death, unable to complete assessment) reported At 6 months, primary outcome data were available for 63/71 of the control group. The reasons for attrition (death, unable to complete assessment) reported Missing outcome data balanced in numbers across experimental and comparator groups, with similar reasons for missing data across groups
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias identified

Logan 1997

Methods	RCT
Participants	UK 111 participants: 53 intervention, 58 control Mean age: 55 years 43% men Clinical definition of stroke Inclusion criteria: first stroke and discharged from hospital and referred to the Social Services occupational therapy department
Interventions	• Experimental intervention: enhanced occupational therapy service provided by social services, included provision of equipment; single therapist • Comparator intervention: usual care

Logan 1997 *(Continued)*

Outcomes	Outcomes were recorded at 3 and 6 months Relevant review outcomes: performance in ADL (measured by BI), performance in EADL (measured by Nottingham Extended Activities of Daily Living); mood or distress (measured by General Health Questionnaire); carer mood (measured by General Health Questionnaire)
Notes	Funding sources/declarations of interest: financial support from the Stroke Association Study dates: not reported Follow-up period used in analysis: 6 months Note: not explicit that unpaid carers were consented and recruited at baseline.Therefore, we did not perform analysis on carer-reported outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Participants randomly allocated by administration clerk; no further details.Insufficient information about the sequence generation process to permit judgement of 'low risk' or 'high risk'
Allocation concealment (selection bias)	Unclear risk	"They were randomly allocated by the clerk using prepared sealed envelopes". Method of concealment not described in sufficient detail to permit judgement – unclear if envelopes were opaque or sequentially numbered
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this introduced bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by BI): unclear how outcome data were obtained i.e. by observation, interview or participant-completed questionnaire EADL (measured by Nottingham Extended Activities of Daily Living): participant-reported - unclear if interview or self-completed questionnaire Mood or distress (measured by General Health Questionnaire): participant-reported - unclear if interview or self-completed questionnaire Carer mood (measured by General Health Questionnaire completed by carer) "Six months after entry to the study the patients were assessed at home by an independent assessor, who had not been informed which treatment the patients had received. The EADL scale was sent prior to the visit, to be completed by the patient and picked up at interview. The independent assessor administered the Barthel Index and the GHQ" Follow-up period used in analysis: 6 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)

Logan 1997 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	At 6 months, 45/53 of the experimental group returned the questionnaires. Reported reasons for attrition were death (5), in nursing home (1) withdrew consent (2) At 6 months, 38/58 of the comparator group returned the questionnaires. Reported reasons for attrition were death (7), withdrew consent (6), in nursing home (6), in hospital (1) At 6 months, a greater (non-significant) number of participants in the usual service group were dead or dependent (nursing home) (n = 13) compared with the enhanced group (n = 6) (Chi^2 = 2.4, P = 0.1; this result is *not* significant at P < 0.05). 2/45 in the enhanced group and 6/38 in the usual care withdrew consent. The difference in number of participants who withdrew was not significant (Chi^2 = 3.04, P = 0.08; this result is *not* significant at P < 0.05). Missing outcome data balanced across groups with similar reasons for missing data across groups
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias identified

Parker 2001

Methods	RCT
Participants	UK Total number of randomised participants: 313 (note: Parker 2001 included an additional intervention arm with 153 participants who were supported with leisure activities. Participants in the leisure intervention arm were not included in this review update. See Differences between protocol and review) Median age: 71/72 Median BI score at baseline: ADL group 18 (IQR 16 - 20); control group 18 (IQR 16 - 19) 58% men Definition of stroke: World Health Organization definition of stroke Recruitment: participants recruited from 1 of 4 participating sites at discharge and all attending a stroke outcome clinic (site 5, Glasgow) with stroke onset < 6 months. Exclusion: discharge to a nursing or residential home; recorded history of dementia; inability to complete outcome questionnaires because of limited use of English language; unable to endure interventions because of coexisting health conditions; lived outside the catchment area
Interventions	• ADL intervention provided by an occupational therapist in the home setting (n = 156). A minimum of 10 treatment sessions lasting not less than 30 minutes were provided to each participant for up to six months. Goals set to improve independence in self-care activities and included practice in activities such as meal preparation and walking outdoors • No occupational therapy (n = 157)
Outcomes	Outcomes were recorded at 6 (primary) and 12 months Relevant review outcomes: performance in ADL (assessed by Barthel Index), performance in EADL (assessed by Nottingham Extended ADL), mood (assessed by General Health Questionnaire-12 item) Carers' mood (assessed by General Health Questionnaire-12)

Parker 2001 *(Continued)*

	The study authors also reported: Nottingham Leisure Questionnaire, the International Stroke Trial outcome, the Oxford Handicap Scale, modified Rankin Scale, London Handicap Scale Outcome evaluations were obtained directly from participants through self-completed questionnaires Follow-up period used in analyses: 12 months
Notes	Funding sources/declarations of interest: financial support from NHS Research and Development Programme (Cardiovascular Disease and Stroke), NHS R&D Programme for Health Technology Assessment, and by Lothian Health. Also grant support from NHS R&D (Cardiovascular Disease and Stroke) Study dates: July 1996 to June 1998 Note: not explicit that unpaid carers were consented and recruited at baseline. Therefore, we did not perform analysis on carer-reported outcomes

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"The COSTAR (Collaborative Stroke Audit and Research) telephone randomisation service was used to allocate patients to one of the three groups: leisure, ADL and control. Randomisation stratified by participating centre and a five-level composite measure of prognosis"
Allocation concealment (selection bias)	Low risk	"The COSTAR (Collaborative Stroke Audit and Research) telephone randomisation service was used to allocate patients to one of the three groups: leisure, ADL and control."
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind study participants and treating therapists delivering the intervention to group allocation due to nature of intervention
Blinding (mortality)	Low risk	"The trial coordinating centre in Nottingham obtained information on death." Not clear where data on death were collected but review authors did not believe this would introduced bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (assessed by BI): obtained directly from participants through self-completed postal questionnaire. Carers reported completing 35% of ADL and 33% of control questionnaires EADL (assessed by Nottingham Extended ADL): obtained directly from participants through self-completed postal questionnaire Mood (assessed by General Health Questionnaire-12 item): obtained directly from participants through self-completed postal questionnaire Carers' mood (assessed by General Health Questionnaire-12): obtained directly from carer through self-completed postal questionnaire Follow-up period used in analyses: 12 months "Masking to individual allocation maintained until all outcome information had been collected." Follow-up period used in analysis: 12 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we

Parker 2001 *(Continued)*

		were unable to judge whether this would influence outcome data (Higgins 2011b)
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	The principle outcome data assessment point was at 6 months At 6 months, 121/156 of the 'ADL' group allocated to the ADL intervention completed the outcomes assessment. The reasons for attrition reported were death (5%) and non-response to questionnaires (17%) At 6 months, 126/157 of the control completed the outcome questionnaires. The reasons for attrition reported were death (4%) and non-response (15%) At 12 months, 106/156 of the 'ADL' group allocated to the ADL intervention completed the outcomes assessment. The reasons for attrition reported were death (10%) and nonresponse to questionnaires (22%) At 12 months, 112/157 of the control completed the outcome questionnaires. The reasons for attrition reported were death (7%) and non-response (22%) Missing outcome data balanced across groups. Reasons for non-response at 12 months not reported
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias identified

Radomski 2007

Methods	RCT
Participants	USA 15 participants: experimental 10 (5 participants in 'habit training'; 5 participants in comparison group 1). 5 in comparison group 2 Mean age: 59 years (SD 14) 80% men All participants admitted to Sister Kenny Rehabilitation Institute (SKRI) Abbott-Northwestern and United Hospitals between 6 November 2006 and 15 March 2007 who met the inclusion/exclusion criteria were given the opportunity to participate in the study Inclusion criteria: participants had the following characteristics: 1. admitted to SKRI for inpatient rehabilitation after onset of first ever stroke, 2. pre-discharge FIM scores of ≥ 4, 3. discharged to his or her home, 4. had a family carer who was willing to participate Exclusion criteria: 1. a history of stroke, 2. supervision required with cognition and communication (FIM score < 5) at or before discharge, 3. assistance needed to carry out hygiene and dressing tasks ((FIM) scores of < 4)
Interventions	• Experimental intervention 1: 'habit training': use of a checklist outlining an individualised, contextual morning self-care routine + daily adherence reinforcement via a wireless device during a 4 to 5-week practice period • Comparator group 1: use of a checklist outlining an individualised, contextual morning self-care routine. Participants were given a wireless pocket computer and had to respond to questions about energy levels 3 times per week • Both the experimental group and the comparator 1 group worked with the researcher (an occupational therapist) to develop their individualised morning self-care routine checklist. In addition, the occupational therapist researcher discussed the value of re-establishing and practicing a regular pattern of day-to-day activities as a means of maintaining and achieving independence

Radomski 2007 *(Continued)*

	• Comparator group 2: no therapeutic intervention
Outcomes	Outcomes were recorded at the end of the intervention (5 weeks) Relevant review outcomes: performance in ADL (measured FIM, performance in EADL (measured by Frenchay Activities Index)) The study authors also reported: Caregiver Burden Scale
Notes	Funding sources/declarations of interest: none reported Study dates: 6 November 2006 and 15 March 2007

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Prior to the beginning to the study, the principal investigator used a computer-based random numbers generator to create two tables of three sets of random numbers (corresponding to the three conditions). One table was used to randomise persons with a Medicare case mix index (CMI) of 101-105 (lower levels of disability at admission to SKRI) and the other table for persons with a CMI of 106–110 (greater degree of disability at admission to SKRI)."
Allocation concealment (selection bias)	High risk	"Once notified that a given patient-caregiver dyad had consented to participate in the study, the researcher drew a numbered card from an envelope and looked up the number on the appropriate table to determine the condition to which the participant was assigned". Researcher allocating participants could possibly see the next assignment - assignment envelopes used without proper safeguards and use of an open allocation schedule
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by Functional Independence measure): participant-reported outcomes by interview. EADL (measured by Frenchay Activities Index): participant-reported outcomes by interview. "Within one-week of discharge from SKRI, former patient-caregiver dyads participated in a telephone interview with a member of the research team in which the Functional Independence Measure, a modified version of the Frenchay Activities Index, and the Caregivers Burden Scale were administered. The caller was an SKRI rehabilitation therapist and member of the research team who was blinded to the participants' group assignment.... These instruments were re-administered via telephone four-five weeks later by the same caller to the same person answering the questions at pretest." Follow-up period used in analysis: 5 weeks

Radomski 2007 *(Continued)*

		Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)
Incomplete outcome data (attrition bias) All outcomes	Low risk	17 dyads consented to participate. 2 participants did not receive the intervention after randomisation (1 = return to hospital; 1 = difficulties in scheduling visits) – not included in any data collection. Did not state which groups they were randomised to, therefore not clear if this was balanced between groups. Large percentage loss but only very small number of participants, judged to be low risk of attrition bias
Selective reporting (reporting bias)	Unclear risk	Study author did not report prospective registration with clinical trials register. Not feasible to judge reporting bias
Other bias	Low risk	No other sources of bias identified

Walker 1996

Methods	Cross-over RCT
Participants	UK Total number of participants recruited: 30 Mean age: 68 years 53% men Definition of stroke: not reported Recruitment: participants recruited at discharge from inpatient facility Exclusion criteria: blind; deaf; unable to understand or speak English prior to stroke onset
Interventions	• Domiciliary occupational therapy over a 3-month period provided by a senior occupational therapist (n = 15). Amount of therapy provided at therapist's discretion. Components of intervention: dressing practice on a regular basis; teaching participants and carers specific dressing techniques, energy conservation techniques, advice on clothing adaptation. Relative/carer involvement in therapy programme and between therapy sessions homework. Single therapist. • No contact with occupational therapist. Usual care (n = 15)
Outcomes	Outcomes were recorded at 3/6 months Relevant review outcomes: performance in activities of daily living (measured by Rivermead ADL self-care section); HRQOL (assessed using Nottingham Health Profile). Other reported outcomes included: Nottingham stroke dressing assessment
Notes	Outcome data recorded at 3 months used in analyses i.e. before cross-over period Funding sources/declarations of interest: financial support from the Stroke Association Study dates: not reported.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information about the sequence generation process to permit judgement of 'low risk' or 'high risk'

Walker 1996 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	The method of concealment was not described to permit judgement of 'low risk' or 'high risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind study participants and treating therapists delivering the intervention to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by Rivermead ADL self-care section): unclear how outcome data were obtained i.e. by observation, interview, or participant-completed questionnaire. HRQOL (assessed using Nottingham Health Profile): participant-reported outcome, unclear if interview or self-completed questionnaire "At three months and six months both groups of patients were assessed by an independent assessor who was unaware of the group to which the patient had been allocated." Follow-up period used in analysis: 6 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b).
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Number of participants allocated to the AB study arm received treatment A (dressing) first, followed by treatment B (no intervention) – number of participants at end of treatment A and treatment B not explicitly stated. Insufficient information to make a decision of 'high' or 'low' risk of bias
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias identified

Walker 1999

Methods	RCT
Participants	UK 185 participants: 94 intervention, 91 control Mean age: 74 years 51% men Baseline functional status: Median BI score at baseline: intervention group 18 (IQR 15 to 20); control group 18 (IQR 15 to 20) Clinical definition of stroke Participants were recruited < 1 month after stroke onset from home Exclusion criteria: > 1 month after stroke onset; history of dementia; living in a nursing or residential home; unable to speak or understand English prior to stroke onset

Walker 1999 *(Continued)*

Interventions	• Experimental intervention: occupational therapy intervention for a period of 5 months. Frequency of visits arranged between therapist, participant, and carer (if appropriate). Mean of 5.8 visits per participant. Aim of therapy was to achieve independence in personal (bathing, dressing, feeding, stair mobility) and instrumental activities of daily living (outdoor mobility, driving a car, using public transport, household chores). Homework tasks were set in between therapy sessions • Comparator intervention: no occupational therapy
Outcomes	Outcomes were recorded at 6 months Performance in ADL (measured by BI); performance in ADL (measured by Nottingham Extended Activities of Daily Living Index); mood or distress (measured by General Health Questionnaire-28 item) Other reported outcomes included: London Handicap Scale, Rivermead motor assessment (gross function), carer mood (General Health Questionnaire-28) and carer Strain Index
Notes	Funding sources/declarations of interest: financial support from the Stroke Association Study dates: February 1994 to March 1998 Follow-up period used in analysis: 6 months Unpaid carers: not explicit that unpaid carers were consented and recruited at baseline.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Our single-blind randomised controlled trial. Randomisation was by numbered, sealed, opaque envelopes prepared from random-number tables."
Allocation concealment (selection bias)	Low risk	"Patients were then allocated randomly to occupational therapy or to no intervention (control group). Randomisation was by numbered, sealed, opaque envelopes prepared from random-number tables."
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not feasible to blind personnel to group allocation due to nature of intervention
Blinding (mortality)	Low risk	Method of obtaining data on death not reported; review authors did not believe this would introduce bias
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Outcomes assessed: ADL (measured by BI): unclear how outcome data were obtained (i.e. by observation, interview, or participant-completed questionnaire) NEADL (measured by Nottingham Extended Activities of Daily Living Index): participant-reported outcome: unclear if interview or self-completed by participant Mood (measured by General Health Questionnaire-28 item): participant-reported outcome; unclear if interview or self-completed by participant An independent assessor who was unaware of treatment allocation assessed the participants in their homes Follow-up period used in analysis: 6 months Knowledge of the assigned intervention (see blinding of participants and personnel above) may have impacted on participant-reported outcomes and we were unable to judge whether this would influence outcome data (Higgins 2011b)

Walker 1999 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	At 6 months, 84/94 of the experimental group completed the outcomes assessment. The reasons for attrition (withdrew consent, died) reported. At 6 months, 79/91 of the comparator group completed the outcomes assessment. The reasons for attrition (withdrew consent, died) reported. Reasons for missing outcome data unlikely to be related to true outcome
Selective reporting (reporting bias)	Unclear risk	Clinical trials registration or prospective publication of a protocol not reported in the full text. Insufficient information to permit judgement of 'low risk' or 'high risk'
Other bias	Low risk	No other sources of bias identified

ADL: activities of daily living
AT: assistive technology
BI: Barthel Index
CMI: Medicare case mix index
EADL: extended activities of daily living
EUROQOL: European Quality of Life Questionnaire
FIM: Functional Independence Measure
HRQOL: health-related quality of life
IQR: inter quartile range
NEADL: Nottingham Extended Activities of Daily Living
OT: occupational therapy
RCT: randomised controlled trial
SD: standard deviation
SKRI: Sister Kenny Rehabilitation Institute

Characteristics of excluded studies *[ordered by study ID]*

Study	Reason for exclusion
Abizanda 2011	RCT, occupational therapy intervention, population of stroke participants < 50%
Andrea 2003	Identified from Cochrane Stroke Group Trials Register, RCT, intervention not performed by occupational therapist
Bai 2012	RCT, intervention for people with stroke, rehabilitation programme included physiotherapy and occupational therapy
Chaiyawat 2012	RCT, intervention for people with stroke, rehabilitation programme performed by a physiotherapist
Cross 2014	Occupational therapy intervention for ADL in people with stroke, not RCT
Desrosiers 2007	RCT, people with stroke, included an occupational therapist as a supervisor but control group also received an active comparison intervention
Egan 2007	RCT, people with stroke, occupational therapy intervention but primary outcome was not ADL, used COPM
Guidetti 2011	RCT, people with stroke, client-centred self-care intervention versus ordinary training, therefore comparison of two active occupational therapy interventions.
Jing 2006	RCT. people with stroke, occupational therapy + exercise versus exercise, therefore occupational therapy in combination with other treatment versus active comparator

Study	Reason for exclusion
Kessler 2014	RCT, people with stroke, occupational performance coaching
Landi 2006	RCT, intervention for people with stroke: intervention group received occupational therapy, both groups received physiotherapy. Excluded as control group had an active comparator
Li 2008	RCT, people with stroke, rehabilitative training + occupational therapy twice a day versus rehabilitative training. Control group included an active comparator
Park 2011	RCT, people with stroke but focused on walking only, not occupational therapy intervention
Rasmussen 2016	RCT, people with stroke, rehabilitation with multidisciplinary team, and also active comparison group
Rodgers 2015	Also called EXTRAS study, RCT, intervention for people with stroke. Extended rehabilitation service which might involve occupational therapist as part of a multidisciplinary team
Sackley 2004	Previously listed in 'Studies awaiting classification' (Legg 2006). Occupational therapy in nursing homes, therefore not eligible. Study currently included in Fletcher-Smith 2013
Sahebalzamani 2009	RCT, intervention for people with stroke, performed by nursing team not occupational therapists
Skidmore 2012	RCT, people with stroke, intervention focused solely on individuals with cognitive impairments after acute stroke
Skidmore 2016	RCT, occupational performance coaching to improve cognitive functioning for people with stroke. Recruited participants with impairment in cognitive functions
Stalhandske 1997	Previously listed in 'Studies awaiting classification' (Legg 2006). Unable to access any full publication of this study and abstract had insufficient information to clarify eligibility (abstract from 1997), therefore excluded
Sun 2001	Previously listed in 'Studies awaiting classification' (Legg 2006). Unable to access any full publication of this study and abstract had insufficient information to clarify eligibility (abstract from 1997), therefore excluded
Tuncay 2006	RCT, people with stroke, self-care educational intervention with physiotherapists, not occupational therapist
Walker 2012	RCT, compared 2 types of occupational therapy for stroke patients with cognitive impairments. Excluded because it tackled a specific impairment; also comparison of different occupational therapy techniques
Whitehead 2016	RCT, people with stroke. Occupational therapy + home care reablement vs home care reablement, therefore active comparator
Yu 2009	RCT, rehabilitation programme for people with stroke. Study authors did not state involvement of occupational therapist
Zhang 2008a	RCT, people with stroke, intervention not performed by an occupational therapist
Zhu 2007	RCT, people with stroke, intervention included physiotherapy and occupational therapy

ADL: activities of daily living
COPM: Canadian Occupational Performance Measure
RCT: randomised controlled trial

Characteristics of studies awaiting assessment *[ordered by study ID]*

Bai 2008

Methods	RCT
Participants	164 people with stroke
Interventions	Rehabilitation versus control groups
Outcomes	Neurological deficit scores Barthel Index
Notes	Abstract only. Difficult to ascertain the components of rehabilitation

Chan 2012

Methods	RCT
Participants	25 people with stroke
Interventions	Control and intervention wards. In the intervention wards, self-care activities were handed over from nursing staff to therapy assistants to practice self-care activities
Outcomes	Motor Activity Log Amount Scale Motor Activity Log How Well Action Research Arm Test (ARAT) Physiotherapy clinical outcome variables Berg Balance Scale Barthel Index
Notes	Abstract only. Unclear whether there was any occupational therapy involvement

Zhang 2008b

Methods	RCT
Participants	80 people with stroke
Interventions	3 grades regular rehabilitation versus no rehabilitation
Outcomes	Fugl-Myer
Notes	Abstract only. Difficult to ascertain the components of 3 grades regular rehabilitation

ADL: activities of daily living
RCT: randomised controlled trial

Characteristics of ongoing studies *[ordered by study ID]*

NCT02802956

Trial name or title	Efficacy of participation in daily life promotion program for patients with chronic stroke
Methods	RCT
Participants	Adults with stroke aged between 20 and 90 years Inclusion criteria: • participants must be 6 months post stroke onset • participants must be able to follow instructions and have no other cognition impairment, Mini Mental State Examination scale score > 20 • participants must be able to communicate with others Exclusion criteria: a clinical diagnosis of: • dementia, psychosis • musculoskeletal disorders or nervous system diseases. • congestive heart failure, hypertension, atrial fibrillation • An adult with stroke who was not from Taiwan
Interventions	Experimental intervention: daily life promotion programme Comparator intervention: general rehabilitation treatment
Outcomes	Primary outcome measures at 1 year: Stroke Impact Scale (SIS) Secondary outcome measures at 1 year: Postural Assessment Scale for Stroke patients (PASS) Action Research Arm Test (ARAT) Fugl-Meyer Assessment (FMA) Self-rated abilities for health practice scale WHO Quality of Life-BREF (Taiwan version) Taiwan Instrumental Activities of Daily Living (TIADL) Barthel Index (BI)
Starting date	June 2016
Contact information	I Ming Hsiao (PI) skipbeat227@gmail.com Yi-Jiun Yang skipbeat227@gmail.com
Notes	

NCT02925637

Trial name or title	Effectiveness of FACoT for individuals post stroke
Methods	RCT
Participants	Inclusion criteria: • age > 18 years

NCT02925637 *(Continued)*

	• minimum of six month post stroke • mild to moderate stroke (NIHSS ≤ 10) • independent prior to the stroke • could understand and speak Hebrew Exclusion criteria: • with no other neurological or psychiatric conditions • without dementia or depression (GDS < 10)
Interventions	Experimental group: FACoT: 10 treatment sessions are provided on a 1-to-1 basis. Each treatment session includes: functional activities, cognitive activities and strategies (pencil-pen treatment), and behavioural strategies Comparator intervention: control group receiving standard care - cognitive and functional assessment
Outcomes	Primary outcome measures: Change between baseline (week 0) to time 1 (postintervention, 10 to 13 weeks later) and between baseline to time 2 (follow-up 1 month later): Canadian Occupational Performance Measure (COPM). Secondary outcome measures: Changes in scores between baseline (week 0) to time 1 (postintervention, 10 to 13 weeks later) and between baseline to time 2 (follow-up 1 month later): Instrumental Activities of Daily Living (IADL) scale Reintegration to Normal Living Index (RNL) Short Form-12v2 Health Survey (SF-12v2) The Daily Living Self Efficacy scale (DLSES) Patient competency rating scale University of Rhode Island Change Assessment (URICA) Montreal Cognitive Assessment (MoCA) Trail making test (TMT) Zoo-map Dysexecutive Questionnaire (DEX)
Starting date	April 2016
Contact information	Tal Adamit, PHD student: adamit33@bezeqint.net Jeffrey Shames: j.shames@gmail.com
Notes	

ARAT: Action Research Arm Test
BI: Barthel Index
BREF: an abbreviated version
COPM: Canadian Occupational Performance Measure
DEX: Dysexecutive Questionnaire
DLSES:The Daily Living Self Efficacy scale
FACoT: Novel Meta-cognitive-functional Intervention
FMA: Fugl-Meyer Assessment
GDS: Geriatric Depression Scale
IADL: instrumental activities of daily living
MoCA: Montreal Cognitive Assessment
NIHSS: National Institutes of Health Stroke Scale
PASS: Postural Assessment Scale for Stroke patients
RCT: randomised controlled trial

RNL: Reintegration to Normal Living Index
SF-12v2: Short Form-12v2 Health Survey
SIS: Stroke Impact Scale
TIADL: Taiwan Instrumental Activities of Daily Living
TMT: Trail making test
URICA: University of Rhode Island Change Assessment
WHO: World Health Organization

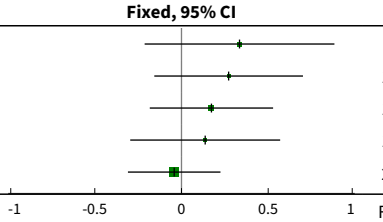
DATA AND ANALYSES

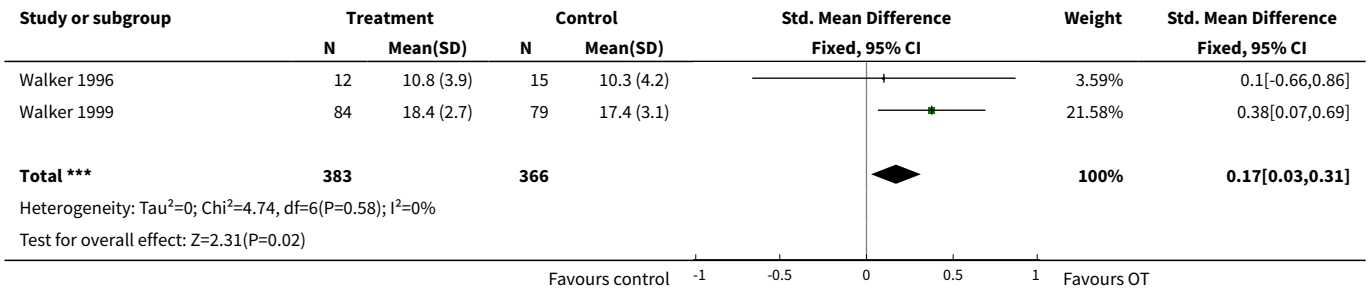
Comparison 1. Occupational therapy versus no routine input

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Activities of daily living	7	749	Std. Mean Difference (IV, Fixed, 95% CI)	0.17 [0.03, 0.31]
2 Death or 'poor outcome' (deterioration or dependency)	5	771	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.52, 0.96]
3 Death by the end of scheduled follow-up	8	950	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.02 [0.65, 1.61]
4 Death or requiring institutional care by the end of scheduled follow up	4	671	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.89 [0.60, 1.32]
5 Death or dependency by the end of scheduled follow-up	4	659	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.89 [0.64, 1.23]
6 Extended activities of daily living scores	5	665	Std. Mean Difference (IV, Fixed, 95% CI)	0.22 [0.07, 0.37]
7 Mood or distress scores	4	519	Std. Mean Difference (IV, Fixed, 95% CI)	0.08 [-0.09, 0.26]
8 Sensitivity to missing data (odds of poor outcome: better)	5	857	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.75 [0.56, 1.00]
9 Sensitivity to missing data (odds of poor outcome: worse)	5	857	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.75 [0.56, 0.99]

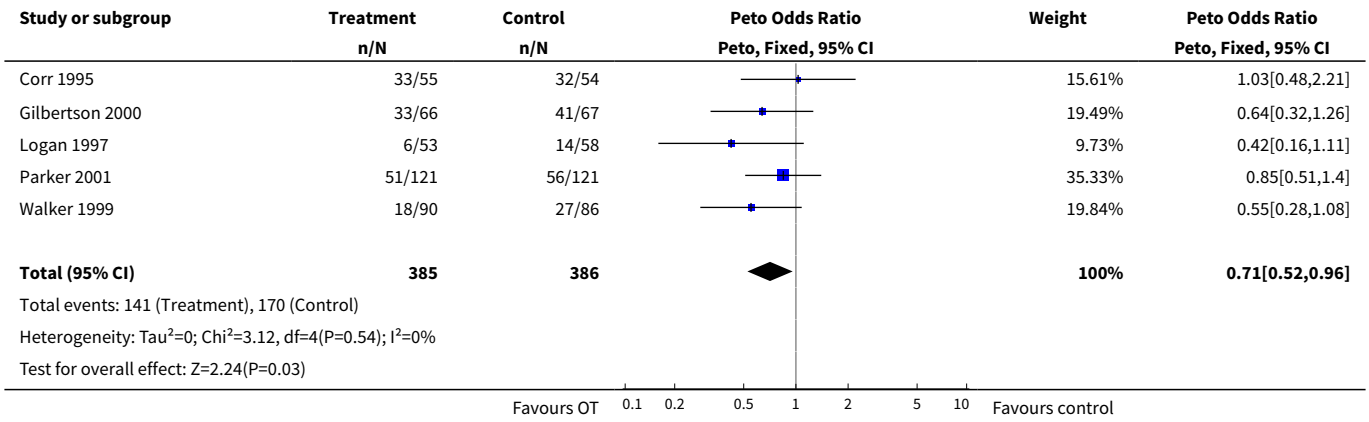
Analysis 1.1. Comparison 1 Occupational therapy versus no routine input, Outcome 1 Activities of daily living.

Study or subgroup	Treatment		Control		Std. Mean Difference	Weight	Std. Mean Difference
	N	Mean(SD)	N	Mean(SD)	Fixed, 95% CI		Fixed, 95% CI
Chui 2004	30	108.9 (11.6)	23	104.9 (12)		6.92%	0.33[-0.21,0.88]
Corr 1995	46	12.3 (4.7)	39	10.9 (5.7)		11.28%	0.27[-0.16,0.7]
Gilbertson 2000	60	16.2 (3.8)	62	15.5 (4.5)		16.39%	0.17[-0.18,0.53]
Logan 1997	45	15.4 (4.6)	38	14.8 (4)		11.09%	0.14[-0.3,0.57]
Parker 2001	106	79.6 (20.1)	110	80.4 (19.3)		29.13%	-0.04[-0.31,0.22]

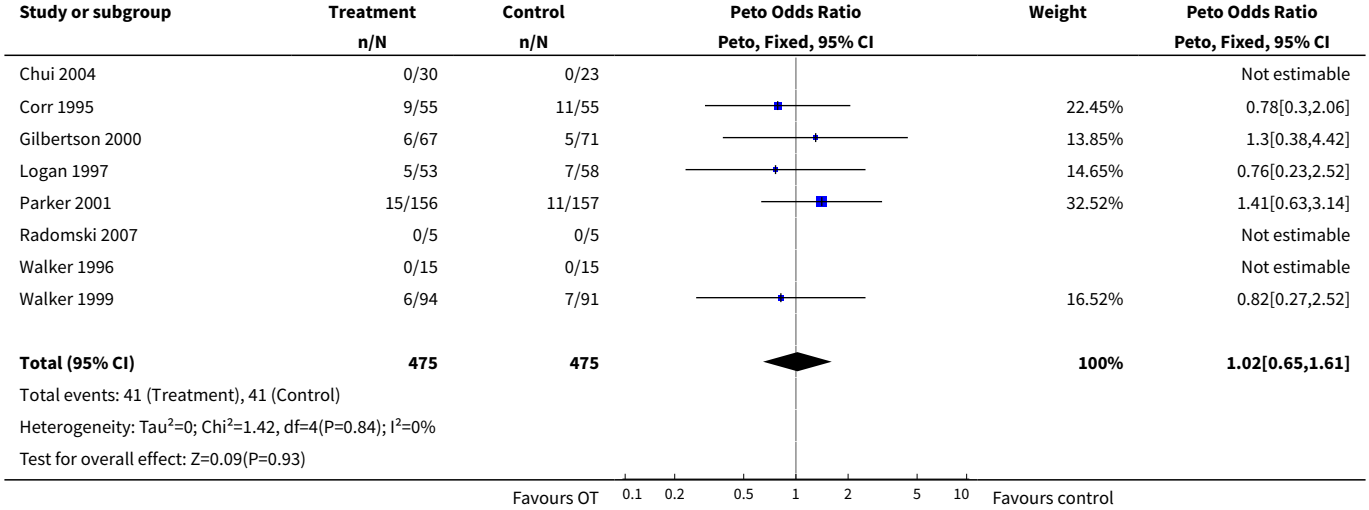




Analysis 1.2. Comparison 1 Occupational therapy versus no routine input, Outcome 2 Death or 'poor outcome' (deterioration or dependency).

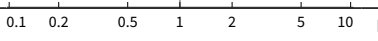


Analysis 1.3. Comparison 1 Occupational therapy versus no routine input, Outcome 3 Death by the end of scheduled follow-up.



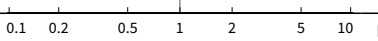
Analysis 1.4. Comparison 1 Occupational therapy versus no routine input, Outcome 4 Death or requiring institutional care by the end of scheduled follow up.

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto, Fixed, 95% CI	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Corr 1995	25/55	29/54		27.93%	0.72[0.34,1.52]
Gilbertson 2000	10/67	9/71		16.75%	1.21[0.46,3.17]
Logan 1997	6/53	14/58		16.77%	0.42[0.16,1.11]
Parker 2001	24/156	20/157		38.54%	1.24[0.66,2.35]
Total (95% CI)	**331**	**340**		**100%**	**0.89[0.6,1.32]**
Total events: 65 (Treatment), 72 (Control)					
Heterogeneity: Tau^2=0; Chi^2=4.03, df=3(P=0.26); I^2=25.57%					
Test for overall effect: Z=0.59(P=0.55)					



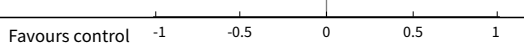
Analysis 1.5. Comparison 1 Occupational therapy versus no routine input, Outcome 5 Death or dependency by the end of scheduled follow-up.

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto, Fixed, 95% CI	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Corr 1995	41/55	41/54		14.18%	0.93[0.39,2.21]
Gilbertson 2000	27/66	20/66		21.09%	1.58[0.78,3.22]
Parker 2001	51/121	56/121		41.45%	0.85[0.51,1.4]
Walker 1999	18/90	27/86		23.28%	0.55[0.28,1.08]
Total (95% CI)	**332**	**327**		**100%**	**0.89[0.64,1.23]**
Total events: 137 (Treatment), 144 (Control)					
Heterogeneity: Tau^2=0; Chi^2=4.5, df=3(P=0.21); I^2=33.37%					
Test for overall effect: Z=0.73(P=0.47)					



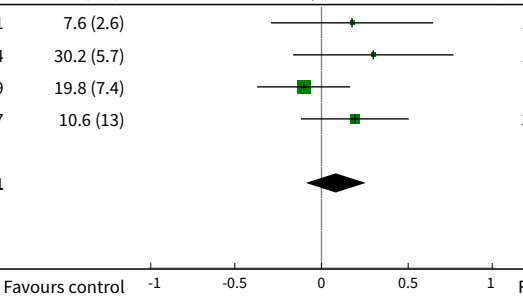
Analysis 1.6. Comparison 1 Occupational therapy versus no routine input, Outcome 6 Extended activities of daily living scores.

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Std. Mean Difference Fixed, 95% CI	Weight	Std. Mean Difference Fixed, 95% CI
Corr 1995	45	5.7 (5.1)	39	5.1 (6)		12.7%	0.11[-0.32,0.54]
Gilbertson 2000	60	28.3 (15.7)	62	26.6 (16.5)		18.54%	0.11[-0.25,0.46]
Logan 1997	45	8.4 (5.9)	38	6.6 (4.8)		12.38%	0.32[-0.12,0.75]
Parker 2001	104	34.9 (19.1)	109	33.3 (19.5)		32.37%	0.08[-0.19,0.35]
Walker 1999	84	43 (15.1)	79	34.7 (17.7)		24.01%	0.5[0.19,0.81]
Total ***	**338**		**327**			**100%**	**0.22[0.07,0.37]**
Heterogeneity: Tau^2=0; Chi^2=4.96, df=4(P=0.29); I^2=19.33%							
Test for overall effect: Z=2.83(P=0)							



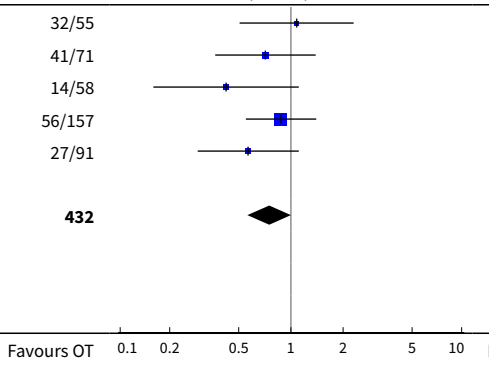
Analysis 1.7. Comparison 1 Occupational therapy versus no routine input, Outcome 7 Mood or distress scores.

Study or subgroup	Treatment N	Treatment Mean(SD)	Control N	Control Mean(SD)	Std. Mean Difference Fixed, 95% CI	Weight	Std. Mean Difference Fixed, 95% CI
Corr 1995	41	8 (2.6)	31	7.6 (2.6)		13.66%	0.18[-0.29,0.64]
Logan 1997	39	31.7 (4.8)	34	30.2 (5.7)		13.95%	0.3[-0.16,0.76]
Parker 2001	105	19.1 (7.3)	109	19.8 (7.4)		41.5%	-0.1[-0.37,0.17]
Walker 1999	83	13 (11.2)	77	10.6 (13)		30.89%	0.19[-0.12,0.5]
Total ***	**268**		**251**			**100%**	**0.08[-0.09,0.26]**
Heterogeneity: Tau²=0; Chi²=3.31, df=3(P=0.35); I²=9.48%							
Test for overall effect: Z=0.94(P=0.35)							



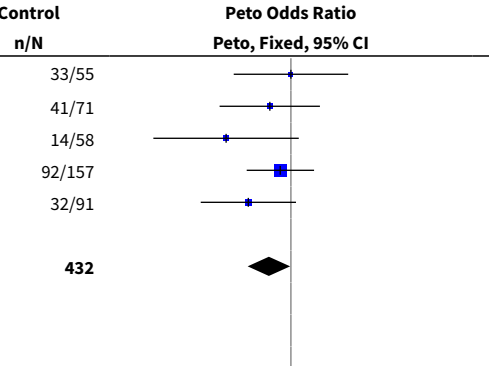
Analysis 1.8. Comparison 1 Occupational therapy versus no routine input, Outcome 8 Sensitivity to missing data (odds of poor outcome: better).

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto, Fixed, 95% CI	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Corr 1995	33/55	32/55		14.68%	1.08[0.51,2.3]
Gilbertson 2000	33/67	41/71		18.9%	0.71[0.37,1.39]
Logan 1997	6/53	14/58		9.03%	0.42[0.16,1.11]
Parker 2001	51/156	56/157		38.65%	0.88[0.55,1.4]
Walker 1999	18/94	27/91		18.73%	0.57[0.29,1.11]
Total (95% CI)	**425**	**432**		**100%**	**0.75[0.56,1]**
Total events: 141 (Treatment), 170 (Control)					
Heterogeneity: Tau²=0; Chi²=3.36, df=4(P=0.5); I²=0%					
Test for overall effect: Z=1.95(P=0.05)					



Analysis 1.9. Comparison 1 Occupational therapy versus no routine input, Outcome 9 Sensitivity to missing data (odds of poor outcome: worse).

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto, Fixed, 95% CI	Weight	Peto Odds Ratio Peto, Fixed, 95% CI
Corr 1995	33/55	33/55		13.8%	1[0.47,2.14]
Gilbertson 2000	34/67	41/71		17.85%	0.76[0.39,1.47]
Logan 1997	6/53	14/58		8.55%	0.42[0.16,1.11]
Parker 2001	86/156	92/157		39.89%	0.87[0.56,1.36]
Walker 1999	22/94	32/91		19.91%	0.57[0.3,1.07]
Total (95% CI)	**425**	**432**		**100%**	**0.75[0.56,0.99]**
Total events: 181 (Treatment), 212 (Control)					
Heterogeneity: Tau²=0; Chi²=3.06, df=4(P=0.55); I²=0%					
Test for overall effect: Z=2.03(P=0.04)					



ADDITIONAL TABLES

Table 1. Completeness of data: activities of daily living

Study	N (I)	n (I)	Dead (I)	Missing (I)	N (C)	n (C)	Dead (C)	Missing (C)
Chui 2004	30	30	0	0	23	23	0	0
Corr 1995	55	46	9	0	55	39	11	5
Gilbertson 2000	67	60	6	1	71	62	5	4
Logan 1997	53	45	5	3	58	38	7	13
Parker 2001	156	106	15	35	157	110	11	36
Radomski 2007	5	5	0	0	5	0	0	0
Walker 1996	15	12	0	3	15	15	0	0
Walker 1999	94	84	6	4	91	79	7	5

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 2. Completeness of data: odds of a poor outcome

Study	N (I)	n (I)	Dead (I) or deteriorate	Missing (I)	N (C)	n (C)	Dead (C) or deteriorate	Missing (C)
Corr 1995	55	55	9 + 24 = 33	0	55	54	11 + 21 = 32	1
Logan 1997	53	53	5 + 1 = 6	0	58	58	7 + 7 = 14	0
Gilbertson 2000	67	66	6 + 27 = 33	1	71	67	5 + 36 = 41	4
Parker 2001	156	121	15 + 36 = 51	35	157	121	11 + 45 = 56	36
Walker 1999	94	90	6 + 12 = 18	4	91	86	7 + 20 = 27	5

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)

N: total number of randomised participants
n: number of participants with reported outcome data

Table 3. Completeness of data: death

Study	N (I)	n (I)	Dead (I)	Missing (I)	N (C)	n (C)	Dead (C)	Missing (C)
Chui 2004	30	30	0	0	23	23	0	0
Corr 1995	55	55	9	0	55	55	11	0
Gilbertson 2000	67	67	6	0	71	71	5	0
Logan 1997	53	53	5	0	58	58	7	0
Parker 2001	156	156	15	0	157	157	11	0
Radomski 2007	5	5	0	0	5	5	0	0
Walker 1996	15	15	0	0	15	15	0	0
Walker 1999	94	94	6	0	91	91	7	0

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 4. Completeness of data: death or requiring institutional care

Study	N (I)	n (I)	Dead (I) or institutionalised	Missing (I)	N (C)	n (C)	Dead (C) or institutionalised	Missing (C)
Corr 1995	55	55	9 + 16 = 25	0	55	54	11 + 18 = 29	1
Logan 1997	53	53	5 + 1 = 6	0	58	58	7 + 7 = 14	0
Gilbertson 2000	67	67	6 + 4 = 10	0	71	71	5 + 4 = 9	0
Parker 2001	156	156	15 + 9 = 24	0	157	157	11+9 = 20	0

C: control group (usual care or no intervention)

I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 5. Completeness of data: death or dependency

Study	N (I)	n (I)	Dead (I) or dependent	Missing (I)	N (C)	n (C)	Dead (C) or dependent	Missing (C)	Measure
Corr 1995	55	55	9 + 32 = 41	0	55	54	11 + 30 = 41	1	Barthel < 15
Gilbertson 2000	67	66	6 + 21 = 27	1	71	66	6 + 14 = 20	5	Barthel < 15
Parker 2001	156	121	15+36 = 51	35	157	121	11 + 45 = 56	36	Barthel < 15
Walker 1999	94	90	6 + 12 = 18	4	91	86	7 + 20 = 27	5	Barthel < 15

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 6. Completeness of data: extended activities of daily living

Study	N (I)	n (I)	Dead (I)	Missing (I)	N (C)	n (C)	Dead (C)	Missing (C)
Corr 1995	55	45	9	1	55	39	11	5
Gilbertson 2000	67	60	6	1	71	62	5	4
Logan 1997	53	45	5	3	58	38	7	13
Parker 2001	156	104	15	37	157	109	11	37
Radomski 2007	5	5	0	0	5	5	0	0
Walker 1999	94	84	6	4	91	79	7	5

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 7. Completeness of data: quality of life

Study	N (I)	n (I)	Dead (I)	Missing (I)	N (C)	n (C)	Dead (C)	Missing (C)
Gilbertson 2000	67	54	6	7	71	54	5	12

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

Table 8. Completeness of data: mood or distress

Study	N (I)	n (I)	Dead (I)	Missing (I)	N (C)	n (C)	Dead (C)	Missing (C)
Corr 1995	55	41	9	5	55	31	11	13
Logan 1997	53	39	5	9	58	34	7	17
Parker 2001	156	105	15	36	157	109	11	37
Walker 1999	94	83	6	5	91	77	7	7

C: control group (usual care or no intervention)
I: intervention group (occupational therapy)
N: total number of randomised participants
n: number of participants with reported outcome data

APPENDICES

Appendix 1. CENTRAL search strategy

#1 MeSH descriptor: [Cerebrovascular Disorders] explode all trees
#2 MeSH descriptor: [Basal Ganglia Cerebrovascular Disease] explode all trees
#3 MeSH descriptor: [Brain Ischemia] explode all trees
#4 MeSH descriptor: [Carotid Artery Diseases] explode all trees
#5 MeSH descriptor: [Cerebral Small Vessel Diseases] explode all trees
#6 MeSH descriptor: [Intracranial Arterial Diseases] explode all trees
#7 MeSH descriptor: [Intracranial Embolism and Thrombosis] explode all trees
#8 MeSH descriptor: [Intracranial Hemorrhages] explode all trees
#9 MeSH descriptor: [Stroke] explode all trees
#10 MeSH descriptor: [Stroke, Lacunar] explode all trees
#11 MeSH descriptor: [Vasospasm, Intracranial] explode all trees
#12 MeSH descriptor: [Vertebral Artery Dissection] explode all trees
#13 stroke* or poststroke or apoplexy* or cerebral vasc* or brain vasc* or cerebrovasc* or cva* or SAH
#14 (brain or cerebr* or cerebell* or vertebrobasil* or hemisphere* or intracran* or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA* or anterior circulation or posterior circulation or basilar artery or vertebral artery or space-occupying) near/5 (ischemi* or ischaemi* or infarct* or thrombo* or emboli* or occlus* or hypoxi*)
#15 (brain* or cerebr* or cerebell* or intracerebral or intracran* or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal gangli* or putaminal or putamen or posterior fossa or hemispher* or subarachnoid) near/5 (hemorrhag* or haemorrhag* or hematoma* or haematoma* or bleed*)
#16 MeSH descriptor: [Hemiplegia] explode all trees
#17 MeSH descriptor: [Paresis] explode all trees
#18 Gait Disorders, Neurologic
#19 hemipleg* or hemipar* or paresis or paraparesis or paretic
#20 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19
#21 MeSH descriptor: [Rehabilitation] explode all trees
#22 MeSH descriptor: [Activities of Daily Living] explode all trees
#23 MeSH descriptor: [Recreation Therapy] explode all trees
#24 MeSH descriptor: [Occupational Therapy] explode all trees
#25 MeSH descriptor: [Rehabilitation, Vocational] explode all trees
#26MeSH descriptor: [Leisure Activities] explode all trees
#27 MeSH descriptor: [Recreation] explode all trees
#28 MeSH descriptor: [Automobile Driving] explode all trees
#29 MeSH descriptor: [Transportation] explode all trees
#30 MeSH descriptor: [Task Performance and Analysis] explode all trees
#31 MeSH descriptor: [Self Care] explode all trees
#32 MeSH descriptor: [Recovery of Function] explode all trees
#33 MeSH descriptor: [Goals] explode all trees
#34 MeSH descriptor: [Work] explode all trees
#35 MeSH descriptor: [Human Activities] explode all trees
#36 MeSH descriptor: [Social Adjustment] explode all trees
#37 MeSH descriptor: [Social Behavior] explode all trees
#38 MeSH descriptor: [Social Facilitation] explode all trees
#39 MeSH descriptor: [Social Environment] explode all trees
#40 MeSH descriptor: [Social Support] explode all trees
#41 occupation* near/5 (therap* or rehabil*)
#42 (activit* near/3 daily living) or ADL
#43 (self or personal) near/5 (care or manage*)
#44 recover* near/5 function*
#45 everyday near/3 (activit* or functioning)
#46 dressing or feeding or eating or toilet* or bathing or mobil* or driving or public transport*
#47 (daily or domestic or house or home) near/5 (activit* or task* or skill* or chore*)
#48 social near/5 (activit* or function* or support* or skill* or adjust* or behavio* or facilitat*)
#49 #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29 or #30 or #31 or #32 or #33 or #34 or #35 or #36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45 or #46 or #47 or #48
#50 #20 and #49

Appendix 2. MEDLINE Ovid search strategy

1. cerebrovascular disorders/ or basal ganglia cerebrovascular disease/ or exp brain ischemia/ or exp carotid artery diseases/ or exp cerebral small vessel diseases/ or exp intracranial arterial diseases/ or exp "intracranial embolism and thrombosis"/ or exp intracranial hemorrhages/ or stroke/ or exp brain infarction/ or stroke, lacunar/ or vasospasm, intracranial/ or vertebral artery dissection/
2. (stroke$ or poststroke or apoplex$ or cerebral vasc$ or brain vasc$ or cerebrovasc$ or cva$ or SAH).tw.
3. ((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA$ or anterior circulation or posterior circulation or basilar artery or vertebral artery or space-occupying) adj5 (isch? emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw.
4. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal gangli$ or putaminal or putamen or posterior fossa or hemispher$ or subarachnoid) adj5 (h?emorrhag$ or h? ematoma$ or bleed$)).tw.
5. hemiplegia/ or exp paresis/ or exp Gait Disorders, Neurologic/
6. (hemipleg$ or hemipar$ or paresis or paraparesis or paretic).tw.
7. or/1-6
8. rehabilitation/ or "activities of daily living"/ or occupational therapy/ or recreation therapy/ or rehabilitation, vocational/
9. leisure activities/ or exp recreation/
10. automobile driving/ or exp transportation/
11. "Task Performance and Analysis"/ or self-care/ or recovery of function/ or goals/
12. exp Work/ or Human Activities/
13. Social adjustment/ or Social behavior/ or Social facilitation/
14. Social environment/ or Social support/
15. (occupation$ adj5 (therap$ or rehabil$)).tw.
16. ((activit$ adj3 daily living) or ADL).tw.
17. ((self or personal) adj5 (care or manage$)).tw.
18. (recover$ adj5 function$).tw.
19. (everyday adj3 (activit$ or functioning)).tw.
20. (dressing or feeding or eating or toilet$ or bathing or mobil$ or driving or public transport$).tw.
21. ((daily or domestic or house or home) adj5 (activit$ or task$ or skill$ or chore$)).tw.
22. (social adj5 (activit$ or function$ or support$ or skill$ or adjust$ or behavio?r or facilitat$)).tw.
23. or/8-22
24. Randomized Controlled Trials as Topic/
25. Random Allocation/
26. Controlled Clinical Trials as Topic/
27. control groups/
28. clinical trials as topic/ or clinical trials, phase i as topic/ or clinical trials, phase ii as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/
29. double-blind method/
30. single-blind method/
31. Placebos/
32. placebo effect/
33. cross-over studies/
34. randomized controlled trial.pt.
35. controlled clinical trial.pt.
36. (clinical trial or clinical trial phase i or clinical trial phase ii or clinical trial phase iii or clinical trial phase iv).pt.
37. (random$ or RCT or RCTs).tw.
38. (controlled adj5 (trial$ or stud$)).tw.
39. (clinical$ adj5 trial$).tw.
40. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
41. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
42. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
43. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
44. (cross-over or cross over or crossover).tw.
45. (placebo$ or sham).tw.
46. trial.ti.
47. (assign$ or allocat$).tw.
48. controls.tw.
49. or/24-48
50. 7 and 23 and 49

Appendix 3. Embase Ovid search strategy

1. cerebrovascular disease/ or brain disease/ or exp basal ganglion hemorrhage/ or exp brain hemangioma/ or exp brain hematoma/ or exp brain hemorrhage/ or exp brain infarction/ or exp brain ischemia/ or exp carotid artery disease/ or exp cerebral artery disease/ or exp cerebrovascular accident/ or exp cerebrovascular malformation/ or exp intracranial aneurysm/ or exp occlusive cerebrovascular disease/ or exp vertebrobasilar insufficiency/
2. (stroke$ or poststroke or apoplex$ or cerebral vasc$ or brain vasc$ or cerebrovasc$ or cva$ or SAH).tw.
3. ((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA$ or anterior circulation or posterior circulation or basilar artery or vertebral artery or space-occupying) adj5 (isch? emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw.
4. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal gangli$ or putaminal or putamen or posterior fossa or hemispher$ or subarachnoid) adj5 (h?emorrhag$ or h? ematoma$ or bleed$)).tw.
5. exp hemiplegia/ or exp paresis/
6. exp hemiplegia/ or exp paresis/ or neurologic gait disorder/
7. (hemipleg$ or hemipar$ or paresis or paraparesis or paretic).tw.
8. or/1-7
9. rehabilitation/ or occupational therapy/ or vocational rehabilitation/ or recreation therapy/
10. occupational therapist/
11. human activities/ or daily life activity/ or driving ability/ or exp recreation/ or exp personal hygiene/
12. exp self care/ or feeding/ or independence/ or home care/ or convalescence/
13. exp "traffic and transport"/
14. task performance/ or job performance/ or work/ or work capacity/ or work resumption/ or employment/
15. social behavior/ or social interaction/ or social adaptation/ or social learning/
16. social environment/ or social care/ or social life/ or social support/ or sociotherapy/ or psychosocial care/ or sociology/
17. (occupation$ adj5 (therap$ or rehabil$)).tw.
18. ((activit$ adj3 daily living) or ADL).tw.
19. ((self or personal) adj5 (care or manage$)).tw.
20. (recover$ adj3 function$).tw.
21. (everyday adj3 (activit$ or functioning)).tw.
22. (dressing or feeding or eating or toilet$ or bathing or mobil$ or driving or public transport$).tw.
23. ((daily or domestic or house or home) adj5 (activit$ or task$ or skill$ or chore$)).tw.
24. (social adj5 (activit$ or function$ or support$ or skill$ or adjust$ or behavio?r or facilitat$)).tw.
25. or/9-24
26. Randomized Controlled Trial/ or "randomized controlled trial (topic)"/
27. Randomization/
28. Controlled clinical trial/ or "controlled clinical trial (topic)"/
29. control group/ or controlled study/
30. clinical trial/ or "clinical trial (topic)"/ or phase 1 clinical trial/ or phase 2 clinical trial/ or phase 3 clinical trial/ or phase 4 clinical trial/
31. Crossover Procedure/
32. Double Blind Procedure/
33. Single Blind Procedure/ or triple blind procedure/
34. placebo/ or placebo effect/
35. (random$ or RCT or RCTs).tw.
36. (controlled adj5 (trial$ or stud$)).tw.
37. (clinical$ adj5 trial$).tw.
38. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
39. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
40. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
41. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
42. (cross-over or cross over or crossover).tw.
43. (placebo$ or sham).tw.
44. trial.ti.
45. (assign$ or allocat$).tw.
46. controls.tw.
47. or/26-46
48. 8 and 25 and 47

Appendix 4. CINAHL EBSCO search strategy

S1 (MH "Cerebrovascular Disorders") OR (MH "Basal Ganglia Cerebrovascular Disease+") OR (MH "Carotid Artery Diseases+") OR (MH "Cerebral Ischemia+") OR (MH "Cerebral Vasospasm") OR (MH "Intracranial Arterial Diseases+") OR (MH "Intracranial Embolism and

Thrombosis") OR (MH "Intracranial Hemorrhage+") OR (MH "Stroke") OR (MH "Vertebral Artery Dissections") OR (MH "Stroke Patients") OR (MH "Stroke Units")
S2 TI (stroke or poststroke or post-stroke or cerebrovasc* or brain vasc* or cerebral vasc or cva or apoplex or SAH) or AB (stroke or poststroke or post-stroke or cerebrovasc* or brain vasc* or cerebral vasc or cva or apoplex or SAH)
S3TI (brain* or cerebr* or cerebell* or intracran* or intracerebral) or AB (brain* or cerebr* or cerebell* or intracran* or intracerebral)
S4TI (ischemi* or ischaemi* or infarct* or thrombo* or emboli* or occlus*) or AB (ischemi* or ischaemi* or infarct* or thrombo* or emboli* or occlus*)
S5S3 AND S4
S6TI (brain* or cerebr* or cerebell* or intracerebral or intracranial or subarachnoid) or AB (brain* or cerebr* or cerebell* or intracerebral or intracranial or subarachnoid)
S7TI (haemorrhage* or hemorrhage* or haematoma* or hematoma* or bleed*) or AB (haemorrhage* or hemorrhage* or haematoma* or hematoma* or bleed*)
S8S6 AND S7
S9S1 OR S2 OR S5 OR S8
S10(MH "Leisure Activities") OR (MH "Recreation+") OR (MH "Rehabilitation") OR (MH "Activities of Daily Living+") OR (MH "Occupational Therapy") OR (MH "Home Occupational Therapy")
S11(MH "Automobile Driving")
S12(MH "Task Performance and Analysis") OR (MH "Self Care") OR (MH "Work")
S13(MH "Social Adjustment") OR (MH "Social Behavior") OR (MH "Social Environment")
S14TI (((activit* N3 daily living) or ADL)) OR AB (((activit* N3 daily living) or ADL))
S15TI ((occupation* N5 (therap$ or rehabil*))) OR AB ((occupation* N5 (therap$ or rehabil*)))
S16TI (((self or personal) N5 (care or manage*))) OR AB (((self or personal) N5 (care or manage*)))
S17TI (recover* N5 function*) OR AB (recover* N5 function*)
S18TI ((everyday N3 (activit* or functioning))) OR AB ((everyday N3 (activit* or functioning)))
S19TI ((dressing or feeding or eating or toilet* or bathing or mobil* or driving or public transport*)) OR AB ((dressing or feeding or eating or toilet* or bathing or mobil* or driving or public transpo)
S20TI (((daily or domestic or house or home) N5 (activit* or task* or skill* or chore*))) OR AB (((daily or domestic or house or home) N5 (activit* or task* or skill* or chore*)))
S21TI ((social N5 (activit* or function* or support* or skill* or adjust* or behavio?r or facilitat*))) OR AB ((social N5 (activit* or function* or support* or skill* or adjust* or behavio?r or facilitat*)))
S22S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21
S23(MH "Randomized Controlled Trials") or (MH "Random Assignment") or (MH "Random Sample+")
S24(MH "Clinical Trials") or (MH "Intervention Trials") or (MH "Therapeutic Trials")
S25(MH "Double-Blind Studies") or (MH "Single-Blind Studies") or (MH "Triple-Blind Studies")
S26(MH "Control (Research)") or (MH "Control Group") or (MH "Placebos") or (MH "Placebo Effect")
S27(MH "Crossover Design") OR (MH "Quasi-Experimental Studies")
S28PT (clinical trial or randomized controlled trial)
S29TI (random* or RCT or RCTs) or AB (random* or RCT or RCTs)
S30TI (controlled N5 (trial* or stud*)) or AB (controlled N5 (trial* or stud*))
S31TI (clinical* N5 trial*) or AB (clinical* N5 trial*)
S32TI ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*)) or AB ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*))
S33((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*)) or AB ((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*))
S34TI ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*)) or AB ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*))
S35TI (cross-over or cross over or crossover) or AB (cross-over or cross over or crossover)
S36TI (placebo* or sham) or AB (placebo* or sham)
S37TI trial
S38TI (assign* or allocat*) or AB (assign* or allocat*)
S39TI controls or AB controls
S40TI (quasi-random* or quasi random* or pseudo-random* or pseudo random*) or AB (quasi-random* or quasi random* or pseudo-random* or pseudo random*)
S41S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40
S42S9 AND S22 AND S41

Appendix 5. PsycINFO Ovid search strategy

1. cerebrovascular disorders/ or cerebral hemorrhage/ or exp cerebral ischemia/ or cerebral small vessel disease/ or cerebrovascular accidents/ or subarachnoid hemorrhage/
2. (stroke$ or poststroke or apoplex$ or cerebral vasc$ or brain vasc$ or cerebrovasc$ or cva$ or SAH).tw.

3. ((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA$ or anterior circulation or posterior circulation or basilar artery or vertebral artery or space-occupying) adj5 (isch? emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw.
4. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal ganglia$ or putaminal or putamen or posterior fossa or hemispher$ or subarachnoid) adj5 (h?emorrhag$ or h? ematoma$ or bleed$)).tw.
5. hemiparesis/ or hemiplegia/
6. (hemipleg$ or hemipar$ or paresis or paraparesis or paretic).tw.
7. 1 or 2 or 3 or 4 or 5 or 6
8. rehabilitation/ or occupational therapy/ or "activities of daily living"/
9. exp vocational rehabilitation/ or work adjustment training/ or occupational adjustment/ or supported employment/
10. recreation therapy/ or leisure time/ or daily activities/
11. automobiles/ or transportation/
12. self-care skills/
13. social adjustment/ or social behavior/ or social adjustment/ or social facilitation/
14. social environments/ or social support/
15. (occupation$ adj5 (therap$ or rehabil$)).tw.
16. ((activit$ adj3 daily living) or ADL).tw.
17. ((self or personal) adj5 (care or manage$)).tw.
18. (recover$ adj5 function$).tw.
19. (everyday adj3 (activit$ or functioning)).tw.
20. (dressing or feeding or eating or toilet$ or bathing or mobil$ or driving or public transport$).tw.
21. ((daily or domestic or house or home) adj5 (activit$ or task$ or skill$ or chore$)).tw.
22. (social adj5 (activit$ or function$ or support$ or skill$ or adjust$ or behavio?r or facilitat$)).tw.
23. or/8-22
24. clinical trials/ or treatment effectiveness evaluation/ or placebo/
25. (random$ or RCT or RCTs).tw.
26. (controlled adj5 (trial$ or stud$)).tw.
27. (clinical$ adj5 trial$).tw.
28. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
29. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
30. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
31. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
32. (cross-over or cross over or crossover).tw.
33. (placebo$ or sham).tw.
34. trial.ti.
35. (assign$ or allocat$).tw.
36. controls.tw.
37. or/24-36
38. 7 and 23 and 37

Appendix 6. AMED Ovid search strategy

1. cerebrovascular disorders/ or cerebral hemorrhage/ or cerebral infarction/ or cerebral ischemia/ or cerebrovascular accident/ or stroke/
2. (stroke or poststroke or post-stroke or cerebrovasc$ or brain vasc$ or cerebral vasc$ or cva$ or apoplex$ or SAH).tw.
3. ((brain or cerebr$ or cerebell$ or vertebrobasil$ or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or middle cerebral artery or MCA$ or anterior circulation or posterior circulation or basilar artery or vertebral artery or space-occupying) adj5 (isch? emi$ or infarct$ or thrombo$ or emboli$ or occlus$ or hypoxi$)).tw.
4. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraparenchymal or intraventricular or infratentorial or supratentorial or basal ganglia$ or putaminal or putamen or posterior fossa or hemispher$ or subarachnoid) adj5 (h?emorrhag$ or h? ematoma$ or bleed$)).tw.
5. hemiplegia/ or exp gait disorders/
6. (hemipleg$ or hemipar$ or paresis or paretic).tw.
7. 1 or 2 or 3 or 4 or 5 or 6
8. rehabilitation/ or exp rehabilitation vocational/ or recreation/
9. human activities/ or "activities of daily living"/ or exp bathing/ or exp leisure activities/ or exp automobile driving/ or exp employment/
10. "task performance and analysis"/
11. self care/ or "recovery of function"/ or goals/
12. Social behavior/ or Social support/ or Social environment/
13. (occupation$ adj5 (therap$ or rehabil$)).tw.
14. ((activit$ adj3 daily living) or ADL).tw.
15. ((self or personal) adj5 (care or manage$)).tw.

16. (recover$ adj5 function$).tw.
17. (everyday adj3 (activit$ or functioning)).tw.
18. (dressing or feeding or eating or toilet$ or bathing or mobil$ or driving or public transport$).tw.
19. ((daily or domestic or house or home) adj5 (activit$ or task$ or skill$ or chore$)).tw.
20. (social adj5 (activit$ or function$ or support$ or skill$ or adjust$ or behavio?r or facilitat$)).tw.
21. or/8-20
22. clinical trials/ or randomized controlled trials/ or random allocation/
23. double blind method/ or single blind method/
24. placebos/
25. (random$ or RCT or RCTs).tw.
26. (controlled adj5 (trial$ or stud$)).tw.
27. (clinical$ adj5 trial$).tw.
28. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
29. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
30. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
31. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
32. (cross-over or cross over or crossover).tw.
33. (placebo$ or sham).tw.
34. trial.ti.
35. (assign$ or allocat$).tw.
36. controls.tw.
37. or/22-36
38. 7 and 21 and 37

Appendix 7. Web of Science search strategy

#1TS=(stroke or poststroke or post-stroke or cerebrovasc* or brain vasc* or cerebral vasc* or cva* or apoplex* or SAH)
#2TS=((brain* or cerebr* or cerebell* or intracran* or intracerebral) NEAR/5 (isch$emi* or nfarct* or thrombo* or emboli* or occlus*))
#3TS=((brain* or cerebr* or cerebell* or intracerebral or intracranial or subarachnoid) NEAR/5 (haemorrhage* or hemorrhage* or haematoma* or hematoma* or bleed*))
#4TS=(hemipleg* or hemipar* or paresis or paretic or hemineglect or hemi-neglect)
#5TS=((unilateral or spatial or hemi$spatial or visual) NEAR/5 neglect)
#6#5 OR #4 OR #3 OR #2 OR #1
#7TS=(occupation* NEAR/5 (therap$ or rehabil*))
#8TS=((activit* NEAR/3 daily living) or ADL)
#9TS=((self or personal) NEAR/5 (care or manage*))
#10TS=(recover* NEAR/5 function*)
#11TS=(everyday NEAR/3 (activit* or functioning))
#12TS=(dressing or feeding or eating or toilet* or bathing or mobil* or driving or public transport*)
#13TS=((daily or domestic or house or home) NEAR/5 (activit* or task* or skill* or chore*))
#14TS=(social NEAR/5 (activit* or function* or support* or skill* or adjust* or behavio$r or facilitat*))
#15#14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7
#16TS=(random* or RCT or RCTs)
#17TS=(controlled NEAR/5 (trial* or stud*))
#18TS=(clinical* NEAR/5 trial*)
#19TS=((control or treatment or experiment* or intervention) NEAR/5 (group* or subject* or patient*))
#20TS=(quasi-random* or quasi random* or pseudo-random* or pseudo random*)
#21TS=((control or experiment* or conservative) NEAR/5 (treatment or therapy or procedure or manage*))
#22TS=((singl* or doubl* or tripl* or trebl*) NEAR/5 (blind* or mask*))
#23TS=(cross-over or cross over or crossover)
#24TS=(placebo* or sham)
#25TI=trial
#26TS=(assign* or allocat*)
#27TS=controls
#28#27 OR #26 OR #25 OR #24 OR #23 OR #22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16
#29#28 AND #15 AND #6

Appendix 8. OpenGrey search strategy

stroke AND (occupational therapy OR rehabilitation)

Appendix 9. US National Institutes of Health Ongoing Trials Register (ClinicalTrials.gov) and World Health Organization International Clinical Trials Registry Platform search strategies

stroke AND (occupational therapy OR rehabilitation)

WHAT'S NEW

Date	Event	Description
31 March 2017	New citation required and conclusions have changed	Occupational therapy increases independence in activities of daily living and reduces the odds of a poor outcome (deterioration or dependency). However, the evidence was rated low-quality. This is a change to the conclusions of the original review. The changes to the conclusions are a result of incorporating 'risk of bias' assessments.
2 January 2017	New search has been performed	We changed the Background section, to add further explanation of how the intervention might work. We included one new trial with 10 participants. We need further information on five trials to assess eligibility. Two trials are ongoing. The review now has 9 included studies, involving 994 participants. We excluded any trials that tested interventions delivered to people with stroke living in long-term care. Therefore, we excluded one previously included study (Sackley 2004). We improved the search strategies and history. We did not handsearch journals. We extended our search of trial registers. Previously, we had included each intervention arm as a combined dataset compared to the control group. In this 2017 update, we selected the intervention that most closely related to our intended intervention. Therefore, we excluded data from leisure promotion intervention arms from two studies: Drummond 1996 and Parker 2001. We incorporated Cochrane's tool for assessing risk of bias into this update. We revisited the critical appraisal of all studies included in previous versions of both reviews updating all assessments of risk of bias. We incorporated 'risk of bias' assessments in analyses by restricting the primary analysis to studies at low and unclear risk of bias. We adhered to the MECIR standards for conduct and reporting.

HISTORY

Protocol first published: Issue 2, 2002
Review first published: Issue 4, 2006

Date	Event	Description
3 September 2008	Amended	Converted to new review format.

CONTRIBUTIONS OF AUTHORS

Lynn A Legg (LL), Sharon R Lewis (SL), Oliver J Schofield-Robinson (OSR), Avril Drummond (AD), Peter Langhorne (PL)
Conceiving the review: LL, AD, PL.
Co-ordinating the review: LL
Undertaking manual searches: SL, Joshua Cheyne (Cochrane Stroke group Information Specialist), LL
Screening search results: LL, SL, OSR
Organizing retrieval of papers: LL, SL, OSR
Screening retrieved papers against inclusion criteria: LL, SL
Appraising quality of papers: LL, SL, PL
Abstracting data from papers: LL, SL, PL
Writing to authors of papers for additional information: LL
Obtaining and screening data on unpublished studies: n/a
Data management for the review: LL
Entering data into Review Manager (RevMan 5.3): LL
RevMan statistical data: LL
Other statistical analysis not using RevMan: LL
Interpretation of data: LL
Statistical inferences: LL
Writing the review: LL, SL
Securing funding for the review: LL
Guarantor for the review (one review author): PL
Reading and checking review before submission: LL, SL, AD, PL

DECLARATIONS OF INTEREST

Lynn Legg: none known
Sharon Lewis: none known
Oliver J Schofield-Robinson: none known
Avril Drummond (AD): AD was a co-author of one of the included studies. AD was not involved in trial selection in this update.
Peter Langhorne (PL): PL was an co-author of one of the included studies. PL was not involved in trial selection in this update.

SOURCES OF SUPPORT

Internal sources

- Greater Glasgow and Clyde Health Board, UK.

  Lynn Legg's time

External sources

- Chest Heart and Stroke, Scotland, UK.
- The Big Lottery Fund, UK.
- National Institute for Health Research, UK.

  Incentive funding

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Differences between original review (Legg 2006) and 2017 update

Changes to 'Background'

We edited the Background section; we added more detail with the purpose of clarifying, justifying, and updating the review.

Changes to 'Search methods for identification of studies'

We did not search the following databases during the 2017 update because of lack of access to databases:

- Dissertations and Theses Database, 1861- ProQuest;
- World Health Organization Library Information System (WHOLIS/IRIS), Virtual Health Library (VHL).

We searched PsycINFO, not PsycLIT, which has been discontinued by the American Psychological Association.

We did not complete the following searches during the 2017 update:

- screening of individual journals and conference proceedings (e.g. handsearching);
- conducting cited reference searches for all included studies in ISI Web of Knowledge.

Changes to 'Criteria for considering studies for this review'

We edited the Types of interventions section: we added additional detail to clarify existing inclusion criteria. We altered the review criteria so that interventions conducted in a nursing home environment were excluded. These are considered elsewhere (Fletcher-Smith 2013). We also stated that we would exclude trials of occupational therapy interventions in combination with other interventions, and trials that tested specific treatment approaches; this additional detail was to clarify existing exclusion criteria that had not been reported in the methods of the original review.

Changes to 'Data collection and analysis'

We edited the Methods section of the review to reflect current MECIR standards, adding additional information for Assessment of risk of bias in included studies, Measures of treatment effect, Unit of analysis issues, Dealing with missing data, Assessment of heterogeneity, Assessment of reporting biases, and Subgroup analysis and investigation of heterogeneity.

Previously we had included each intervention arm as a combined data set compared with the control group. In the 2017 update, we selected the intervention that most closely related to our intended intervention. This decision affected analysis of data for Drummond 1996 and Parker 2001, in which we excluded data from an intervention arm of promotion of leisure skills in each study.

In this 2017 update, we did not include carer-related outcome data if there was no description of carer consent to study participation in the full study report.

Changes to Results

We excluded Sackley 2004 (previously named Nottingham 2001) from the 2017 update. This study was no longer eligible because of changes to the criteria for considering studies for this review.

We renamed previously included studies to match current Cochrane standards: Cardiff 1995 is now Corr 1995; Glasgow 2000 is now Gilbertson 2000; Hong Kong 2004 is now Chui 2004; Nottingham 1995 is now Drummond 1996; Nottingham 1996 is now Walker 1996; Nottingham 1997 is now Logan 1997; Nottingham 1999 is now Walker 1999; and TOTAL 2001 is now Parker 2001.

INDEX TERMS

Medical Subject Headings (MeSH)

*Activities of Daily Living; *Occupational Therapy; *Stroke Rehabilitation; Depression [epidemiology]; Randomized Controlled Trials as Topic; Stroke [mortality] [psychology]

MeSH check words

Adult; Humans